4. ENVIRONMENTAL CONSEQUENCES

The following chapter discusses the environmental impacts of each of the alternatives on the natural, cultural, and other resources of concern. The degree of impact was quantified in some cases, such as when a model was used or data were obtainable. However, often only qualitative descriptions of impact were possible. The following definitions were applied throughout this chapter, unless otherwise noted:

Impact Levels

Negligible: the impact is localized or at the lower levels of detection
Minor: the impact is localized or slight, but detectable and would not affect overall resources
Moderate: the impact is clearly detectable and could have an appreciable effect on overall resources; has the potential to become major
Major: the impact is highly noticeable and characterized as severe, or if beneficial, has exceptional beneficial effects

Duration

Duration refers to the time period over which the effects of an impact persist. Most impacts in this document were considered to be permanent qualitative shifts in resource values. For impacts that required a more definable time frame for emphasis or clarity, the duration of impacts across all categories were determined using the following definitions:

Short-term: the impacts last for less than 2 years, often quite less
Long-term: the impacts last for more than 2 years

Additionally, unless otherwise stated, all analyses were performed by assessing the final state of the alternatives rather than the incremental nature of each alternative. Similarly, analyses largely focused on the management emphasis as described for each alternative in Chapter 2 since these would likely include the greatest impacts. Impacts related to other less-used management methods were generally considered negligible in comparison to the emphasized methods.

4.1. IMPACTS ON CULTURAL RESOURCES

4.1.1. Regulations and Policies

National Park Service guidelines for cultural resource management are derived from a series of laws, regulations, and policies. Of particular importance is the enabling legislation establishing each park for a specific purpose. As previously stated in this document, CVNP was created by Congress in 1974 as Cuyahoga Valley National Recreation Area for the purpose of "preserving and protecting for public use and enjoyment, the historic, scenic, natural, and recreational values" of the Cuyahoga Valley (Public Law 93-555, 1974). Cultural Resource management at CVNP primarily concentrates on the preservation and protection of historic and scenic values of which the rural landscape is part.

Other laws, regulations, and policies have general application for cultural resource management throughout the NPS. These include the Antiquities Act, the Historic Sites Act, the National Historic Preservation Act, the National Environmental Policy Act, the Archeological and Historic Preservation Act, the Archeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act. The following is a brief description of each act:

Antiquities Act (1906): provided for the protection of historic, prehistoric, and scientific features on federal lands.

Historic Sites Act (1935): declared it a national policy to preserve historic sites, buildings, and objects for public use and authorized the NPS to restore, reconstruct, rehabilitate, preserve, and maintain historic and prehistoric sites, buildings, objects, and properties of national historic or archeological significance.

National Historic Preservation Act (1966): declared historic preservation as a national policy and authorized the Secretary of the Interior to expand and maintain a National Register of Historic Places that would include properties of national, state, and local historic significance.

Archeological and Historic Preservation Act (1974): provided for the preservation of significant scientific, prehistoric, historic, and archeological materials and data that might be lost or destroyed as a result of federally sponsored projects.

Archeological Resources Protection Act (1979): defined archeological resources as any material remains of past human life or activities that are of archeological interest or at least 100 years old and provided for preservation and custody of excavated materials, records, and data.

Native American Graves Protection and Repatriation Act (1990): assigned ownership or control of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony that are excavated or discovered on

federal lands or tribal lands to the lineal descendants or affiliated Indian tribes or Native Hawaiian organizations.

Protection of cultural resources is also in accordance with Executive Order 11593, *Protection and Enhancement of the Cultural Environment*, 1971. EO 11593 instructs all federal agencies to support the preservation of cultural properties and directs them to identify and nominate cultural properties under their jurisdiction to the National Register of Historic Places.

Cultural resource management procedures are detailed in the NPS *Management Policies* (NPS 2001e) and the *NPS Cultural Resource Management Guideline* (NPS 1997a). Specific standards and guidelines for the treatment of cultural resources are provided in The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation, Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings, and Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes.

4.1.2. Methodology

4.1.2.1.Archeology

The analysis of impacts on archeological resources is a qualitative assessment based on a review of existing park policies on the treatment of archeological resources, existing park data on archeological resources, and consultation with NPS archeologists.

Potential impacts on archeological resources may occur from any undertaking that includes any project, activity, or program that will cause ground disturbance. As such activities as cultivation, compaction, erosion, building construction, utility installation, and fence installation are expected, archeologists will conduct preliminary inventories as part of the planning process to minimize adverse impacts on resources. Inventory methods typically include pedestrian surface survey, shovel testing, and geophysical survey. Small-scale evaluative test excavations usually follow. These inventories may lead to the discovery of a site or to the confirmation that no archeological resources exist in a specified location. When a site is discovered, the revealed resources will be evaluated under National Register standards and measures to lessen impacts will be recommended and employed such as site avoidance, project redesign, or other site protection measures.

Impacts on archeological resources will be analyzed by comparing how much ground disturbance is proposed in each alternative, as this ground disturbance presents risks to yet undiscovered archaeological resources.

4.1.2.2.Historic Structures

The analysis of impacts on historic structures is a qualitative assessment based on a review of existing park policies on the treatment of historic structures, existing park data on historic structures, and consultation with the park historian and historical architect.

Potential impacts on historic structures may occur from any undertaking that includes any project, activity, or program that can result in changes in the character or use of a structure. Maintaining the historic character and slowing the rate at which historic material is lost are the two main goals for historic structure preservation. In particular, the compatibility of use and continued preservation maintenance are primary concerns. Thus, impacts on historic structures will be analyzed among the alternatives by comparing the compatibility of use in terms of portraying the historic rural character and the long-term preservation potential in terms of the likelihood of preserving the structure and protecting historic material over time.

In general, it is assumed that the historic character of a structure is best portrayed when the historically significant physical attributes of the structure as well as the traditional use of the structure are both retained. Although rehabilitation as a preservation method allows for contemporary non-agricultural uses to be acceptable, the most compatible uses are those that also portray an agricultural function since this was the traditional use.

It is also assumed that in terms of long-term preservation potential, the likelihood of preserving a structure and protecting its historic material over time is improved through the utilization of the structure. By utilizing a structure, the rate of deterioration to historic materials from natural processes is slowed. Utilization has also proven to deter vandals, which protects structures from unexpected destruction. Regular maintenance schedules also accompany utilized structures. When structures are directly maintained by the NPS, it is generally ensured that preservation standards are followed. When others maintain structures, such as lessees, protection and preservation occurs through restrictive guidelines and immediate involvement of NPS expert personnel. In these cases, the NPS assumes a small, added degree of risk to structures.

4.1.2.3.Cultural Landscapes

The analysis of impacts on the rural landscape is a qualitative assessment based on a review of existing park policies on the treatment of cultural landscapes, existing park data on cultural landscapes, and consultation with the park historian and historical landscape architect.

Potential impacts on the rural landscape may occur from any undertaking that includes any project, activity, or program that can result in changes in the character or use. Protecting and preserving the historic character of the landscape is the primary goal for

cultural landscape management. Thus, the primary goal in this EIS is to preserve the rural landscape by protecting and preserving the historic rural character of the landscape.

At both the park-wide scale and the farm scale, impacts will be analyzed by comparing each alternative's ability to portray the historic rural character of the landscape. In general, the historic character of a landscape is defined by its function, visual quality, spatial organization, land use patterns, and character-defining features. In turn, it is assumed that the historic character of a landscape is more accurately portrayed when the greatest number of the above criteria are met and a living, working rural landscape is portrayed through function as well as aesthetics.

4.1.3. Impacts Common To All Alternatives

Cultural Resources. For all alternatives, various impacts to Cultural Resources are specifically evaluated in the Alternative sections. However, in general, for all action alternatives (Alternatives 2, 3, & 4), no major adverse impacts on cultural resources are expected, as site level compliance will be conducted for NEPA and Section 106 of the National Historic Preservation Act. Preliminary project inventories and evaluations will be completed and resources evaluated under National Register criteria. For historic structures and cultural landscapes, The Secretary of the Interior's Standards for rehabilitation will be followed to ensure that the integrity and character of a historic structure is maintained and that the historic character of the landscape is retained. For archeological resources, the evaluation of sites would not minimize impacts, but would instead provide data to be used in site avoidance, project redesign, and site protection – efforts that might reduce and/or lessen project impacts. If impacts were to occur to any cultural resource, mitigation measures would be implemented.

As guided by National Register criteria and the Cultural Resources Management Guideline (NPS 1997a), mitigation measures for cultural resources would be implemented when it is not possible to protect archeological resources, historic structures, and cultural landscapes and an adverse impact is expected. Mitigation measures typically consist of data recovery and detailed recording. Data recovery projects will be designed in consultation with the State Historic Preservation Office and will conform to NPS and professional standards. Archeological data recovery projects, in particular, will include a written Mitigation Plan and Memorandum of Agreement between the park and the State Historic Preservation Office. This agreement will then be filed with the Advisory Council on Historic Preservation.

Archeological Resources. It is expected that the uncovering of archeological resources from project inventory efforts conducted because of proposed ground disturbance activities will have secondary moderate beneficial impacts on the knowledge base of the history and prehistory of the park. Since CVNP conducts archeological survey work in conjunction with projects proposing ground disturbance activities, these project inventories are useful means, although not the only means, of gathering new archeological data for research purposes. It is anticipated that Alternatives 1, 2, and 4 will have the greatest amount of proposed ground disturbance activities and thus, have

the most archaeological survey work conducted. Archeological resources may also be made temporarily inaccessible by paving actions should they occur. This impact is considered negligible as the resources may still be recovered intact at a later date.

For all alternatives, it is also expected that actively cultivated areas, including those that have experienced recent disturbance, are susceptible to cumulative long-term impacts from surface exposure of artifacts. Exposed artifacts are subject to continued weathering, cultivation damage, and unauthorized collecting. In addition, as soil continues to erode from cultivated fields, the plow zone moves down, disturbing new soil and potentially damaging archeological resources including occupational features such as hearths or storage pits that had previously been beneath the plow zone.

Structural Damages. Damage to structural resources by users may occur on a small scale over time. In particular, a higher risk is assumed when non-park users, such as lessees, are the primary users. Nonetheless, no adverse impacts on the historic character or the long-term preservation potential are expected, however, as most damage will likely be very minor and reversible through repairs.

National Historic Landmark. Negligible impacts on the National Historic Landmark property are expected to occur as the adjacent fields have continued to be actively maintained through mowing or farmed through the years. In addition, although within proximity, the farm property is well segregated from the National Historic Landmark property by the road and hillside with views to the back property being screened by vegetation.

Other Historical Themes. A small number of rural landscape elements may have been identified in the 1987 CLR as contributing primarily to other historical themes (e.g., Settlement or Transportation). Such elements are considered to contribute secondarily to the Agriculture theme. Few if any adverse impacts on these resources in terms of their primary theme are expected, and any such impacts are considered to be negligible.

Ohio & Erie Canal National Heritage Corridor. The proposed action will affect resources located within the National Heritage Corridor. However, since the amount of total land affected by this project is very small in scope relative to the 110-mile long Corridor, any impacts are expected to be negligible.

CanalWay Scenic Byway. The proposed action will affect resources located along the Scenic Byway. However, since the amount of total area affected by this project is very small in scope relative to the 110-mile long Byway, any impacts are expected to be negligible.

None of the impacts common to all alternatives are expected to lead to an impairment of the cultural resources of Cuyahoga Valley National Park.

4.1.4 Cumulative Impacts Common To All Alternatives

The rural landscape of CVNP is representative of the agricultural heritage of the Northeast Ohio region as well as the development of farming in America. The cultural resources associated with the rural landscape are, in turn, also important on a regional and national scale. As development occurs in surrounding areas and throughout the country, more and more historic farm structures and farm fields are being lost. With this loss of open space, the archeological research potential in CVNP becomes relatively more significant as does the preservation of farm structures and farm fields which also serve to preserve and perpetuate a piece of regional and national history. Because of this relationship, any beneficial or adverse impacts on the rural landscape and its components in CVNP become relatively more important.

4.1.4. Impacts of Alternative 1 – No Action

4.1.4.1.Archeology

Under this alternative, conventional cultivation methods by SUP farmers will continue. Tilling turns up the soil and can impact archeological resources through equipment damage and surface exposure. Exposure, in particular, is a concern as it opens the resources to weathering, unauthorized collecting, and increased erosion. In addition, conventional cultivation methods do not typically include the use of cover crops in between harvest and spring planting to cover and stabilize soils, further increasing exposure impacts. As these conventional cultivation methods are expected to continue over time, repeated disturbances and impacts are also likely. Thus, moderate adverse impacts on archeological resources are expected. In turn, impacts from tilling are probably greater for lands that are not currently cultivated since resources in actively farmed areas have recently experienced disturbance and impacts from erosion are probably greater for fields that are located in sloped areas. Livestock grazing levels are expected to remain low under this alternative, so adverse impacts from compaction and erosion caused by grazing are expected to be negligible to minor. Should livestock uses unexpectedly increase under SUPs, related impacts could increase.

Little new construction in the form of structures or fencing is foreseen under this alternative. Therefore, only negligible impacts on archeological resources are expected from these activities. The high level of park utilization of existing structures and long-term leases expected in this alternative will lead to the installation of new utilities as part of upgrading facilities. Line trenching and other excavations are likely to occur. Minor to moderate adverse impacts from these ground disturbing activities are anticipated.

4.1.4.2.Historic Structures

Rehabilitation for compatible uses for park operations and long-term leases has a moderate beneficial effect on the historic character of structures as the historic character

is retained through preservation of significant physical attributes. However, traditional agricultural use will usually be absent, which lessens the degree of the historic character portrayed.

Major beneficial effects on long-term preservation potential of structures are expected when they are readily rehabilitated and put into use for park operations or long-term leases.

However, beneficial effects on historic character and long-term preservation potential under this alternative are highly dependent on the rate at which the structures are actually rehabilitated and put into use. As past history in the park has demonstrated, the opportunistic approach is accompanied by a risk of adverse impact on structural resources. Without a comprehensive plan to guide utilization, many structures may lie vacant for relatively long periods of time awaiting a use to arise.

Outbuildings are particularly at risk because it is often difficult to work them into park use or long-term leases without an agricultural use. When they are designated for use, it is often for compatible, but non-agricultural uses that require additional utilities and interior and exterior changes (e.g., use of barns as a conference site or event hall).

Efforts would always be taken to implement interim stabilization measures to prevent the total loss of a structure. However, a structure in an unused state is at higher risk of deterioration and destruction from natural processes and human factors such as vandalism. As a result, the historic integrity of a structure is often decreased through the loss of character defining features. In addition, when rehabilitation is eventually initiated, it is often more difficult from a construction standpoint, as well as more costly. This delay or lack of active use may result in minor to moderate adverse impacts on the historic character and long-term preservation potential of affected structures.

4.1.4.3.Cultural Landscapes

When proposed agricultural fields are used for agricultural purposes, major beneficial effects to the historic rural character are expected at the farm level as well as the park-wide level. The activity of agriculture in the fields benefits the rural character of the landscape since it not only maintains land use patterns, spatial relationships, character-defining features and the visual appearance of the rural landscape, but it is also a continuation of the historic use.

Most associated curtilage lands will likely be used with existing structures for compatible uses that are not agricultural in nature or associated with the fields. Since the historic use, as well as the historic working association between the lands and structures is missing, the historic character of the farm landscape and the park-wide landscape is decreased. Nevertheless, maintaining a rural appearance, spatial relationships, character-defining features, and land use patterns will have moderate beneficial effects on the rural character of the farm and park rural landscapes.

However, as with historic structures, delays in utilization under the opportunistic approach of this alternative are expected to diminish these benefits to the cultural landscape. As past history in the park has demonstrated, fields that remain unused are likely to succumb to natural succession and eventually are lost to woodlands over time. Field delineations, spatial relationships, and land use patterns are compromised at a minimum, and often completely lost. Major adverse impacts on the historic character of the rural landscape are expected at the farm level, but on the park scale, the adverse impact on the rural character is expected to be only minor to moderate, depending on the number of acres and fields lost. Thus, as more acreage and fields are lost, greater adverse impacts on the overall character of the rural landscape occur.

In the past, curtilage lands around unused structures have also been neglected or minimally maintained due to scheduling limitations. As a result, minor to moderate adverse impacts are expected to the historic rural character of the landscape at the farm scale and the park scale depending on the amount of overgrown land and the degree to which the views of the farmstead, circulation patterns, small scale features, and planted vegetation are lost.

Additionally, unused structures are expected to have minor to moderate adverse impacts on the historic character of the landscape at the park-wide and farm levels as the structures are at risk of physical deterioration or destruction. Of greatest concern to the landscape is the loss of character-defining external features of structures. The more the external façade of a structure deteriorates and the more structures that deteriorate, the greater the adverse impacts on the rural character of the landscape at both scales.

Little new construction is expected in the form of structures or fences under this alternative. Thus, little or no change in land use patterns, spatial relationships, or visual appearances are likely to occur and negligible impacts on the historic character of the rural landscape at the farm and park scale are expected.

4.1.4.4.Cumulative Impacts

No cumulative impacts specific to this alternative are expected except those previously noted as common to all alternatives.

4.1.4.5.Conclusion

Conventional cultivation methods would have moderate and continuing adverse impacts on archeological resources under this alternative, while conventional grazing would have negative to minor adverse impacts. Ground disturbance activities related to utility installation are expected to have minor to moderate adverse impacts on archeological resources. Little new construction is foreseen under this alternative. Negligible impacts

on archeological resources from new construction or fencing are expected from these activities.

Moderate beneficial effects on the historic character and major benefits on the long-term preservation potential of structures in the park are expected under this alternative from active park use and long-term leasing. However, if there are delays in putting structures into active use, minor to moderate adverse impacts on historical character and long-term preservation potential may occur.

Major beneficial effects to the rural character of the landscape are expected as fields are used for agricultural purposes. Should the loss of agricultural fields to succession occur, it would be a major adverse impact on the historic character of the rural landscape at the farm level and a minor to moderate adverse impact for the park landscape.

Moderate beneficial effects on the rural character of the farm and park rural landscapes are expected when curtilage lands are used with existing structures for compatible uses that are not agricultural in nature or associated with the fields. When curtilage lands are neglected or minimally maintained in association with unused structures, however, minor to moderate adverse effects on the historic rural character of the landscape at the farm and park scales are expected.

The implementation of this alternative is not expected to lead to an impairment of the cultural resources of Cuyahoga Valley National Park.

4.1.5. Impacts of Alternative 2 – Countryside Initiative (Preferred Alternative)

4.1.5.1.Archeology

Under this alternative, sustainable practices often include no-till cultivation practices such as frost-crack seeding or chisel plowing as well as the use of cover crops to cover and stabilize soils after harvest. No-till practices will reduce the amount of tilling and therefore, the potential impacts to archeological resources from equipment damage and surface exposure will also be reduced. Cover crops will help reduce surface exposure of artifacts and, in turn, reduce impacts from weathering, unauthorized collecting, and erosion. In addition, the routine presence of on-site farmers is likely to discourage unauthorized collecting as well. Thus, negligible to minor adverse impacts on archeological resources are expected. Livestock grazing will be primarily rotational, which protects the ground from becoming overly compacted and decreases erosion potential. Thus, even though it is likely that more long-term lease farmers will graze livestock, rotational methods will minimize the impacts on archeological resources and adverse impacts are expected to be negligible to minor.

The moderate amounts of new structures expected under this alternative will typically be installed with foundations or footers that require excavation. Moderate adverse impacts on archeological resources are expected from this activity. Additionally, a large amount of new fencing will likely be installed throughout the rural landscape in order to promote

profitable farming in this alternative. Fencing will be utilized to protect crops from wildlife as well as to keep livestock pastured. Although the size of individual excavations is small, the total number of fence posts is expected to be high and the fence posts are expected to be distributed broadly across the park. Thus, the large amount of new fencing is expected to have moderate adverse impacts on archeological resources.
Existing structures will be primarily managed through long-term leasing. In order to make these structures function for full-occupancy, it is expected that new utilities will be installed to upgrade facilities. Thus, the adverse impact on archeological resources from line trenching and other utility excavations is expected to be moderate.

4.1.5.2.Historic Structures

The rehabilitation and long-term leasing of many associated historic structures will provide for compatible contemporary use of the structures as they relate to a modern agricultural lifestyle. Major beneficial effects to the historic rural character of structures are expected, as not only will the significant physical elements of a structure be retained, but the agricultural use will also be reestablished through modern sustainable practices.

A comprehensive plan for the utilization of structures accompanies this alternative, thus it is expected that rehabilitation and the full use of entire structures through long-term leases will be readily implemented. In turn, major beneficial effects to the long-term preservation potential of historic structures are anticipated as continuous full-occupancy and regular maintenance is expected to occur.

4.1.5.3.Cultural Landscapes

Under this alternative, joint agricultural use will reestablish functional unity of farmsteads and associated lands. Structures as well as the surrounding curtilage and associated fields will have an agricultural purpose. This will have major beneficial effects on the historic character of the rural landscape at both the farm and the park scale. The rural appearance is maintained and the historic uses are retained.

New structures are expected to have negligible impacts on the historic character of single farm landscapes as well as the park-wide rural landscape. While the addition of new structures will inevitably alter historic spatial relationships, land use patterns, and the visual appearance of the farmstead curtilage, contemporary structures and fencing will undergo site-level NEPA and Section 106 compliance. These compliance efforts will ensure that they are designed to be modern but compatible to the rural landscape to ensure that they do not detract from the historic character of the site.

It is expected that relatively large amounts of new fencing will be installed, covering a substantial amount of the fields designated for agricultural purposes, most of which are currently not fenced but were likely fenced at one point in time. New fencing will be modern but compatible in design and it is proposed that new fencing patterns will follow

historic fencing patterns when possible. However, to meet modern functional needs, new fencing patterns may be implemented which would alter historic land use patterns and spatial relationships of the landscape. At the same time, new fencing will reestablish an important missing character-defining feature of the traditional rural landscape. Thus, in consideration of all the above issues, new fencing is expected to have moderate beneficial effects on the historic character of the rural landscape at the farm and park scales.

4.1.5.4.Cumulative Impacts

No cumulative impacts specific to this alternative are expected except those previously noted as common to all alternatives.

4.1.5.5.Conclusion

Negligible to minor impacts on archeological resources are expected from agricultural activities. These impacts are less than Alternative 1 due to the use of sustainable practices and the routine presence of on-site farmers. The moderate amounts of new structures and a large amount of new fencing will have moderate adverse impacts on archeological resources. Utility installation is expected to cause moderate adverse impacts on archeological resources. Adverse impacts on archeological resources from new construction activities are expected to be greatest under this alternative.

Major beneficial effects to the historic character of structures are expected as significant physical attributes and historic agricultural uses are retained. This alternative is expected to have the most compatible use of any alternative in terms of most fully preserving the historic rural character. Major beneficial effects on the long-term preservation potential of historic structures from continuous full-occupancy and regular maintenance are also expected.

Major beneficial effects are expected to the historic character of the rural landscape at a farm scale as well as the park scale due to the joint agricultural use of lands and structures. This alternative best preserves the rural character compared to the other alternatives.

Negligible adverse impacts are expected from new construction at both the farm and park landscapes scales. The large amount of new fencing is expected to have moderate beneficial effects on the historic character of the rural landscape at the farm and park scales.

The implementation of this alternative is not expected to lead to an impairment of the cultural resources of Cuyahoga Valley National Park.

4.1.6. Impacts of Alternative 3 – Vista Management

4.1.6.1.Archeology

Little farming is expected to occur although it is assumed it would be primarily conventional when it occurs. Impacts on archeological resources from such a small amount of conventional cultivation and grazing are expected to be negligible. Mowing to maintain open fields or for wildlife habitat does not typically create any ground disturbance so no impacts are expected.

Little or no new structures or fencing are likely to be constructed under this alternative as the emphasis is on utilizing existing structures. In turn, negligible to minor adverse impacts on archeological resources is expected.

Very little utility installation is expected in association with the use of structures as scene-setters. Occasional utility installation may occur in relation to park used or leased structures. Therefore, adverse impacts on archeological resources are expected to be negligible to minor.

4.1.6.2.Historic Structures

Rehabilitation of structures as scene-setters implies that the concentration is on the exterior façades with interiors being only minimally retained. Preservation of the exteriors will result in moderate beneficial effects to the historic character of structures. Park-used structures also have a moderate beneficial effect on the historic character of structures as the historic character is retained through the physical components.

The use of historic structures as scene-setters will have moderate beneficial effects on their long-term preservation. Regular preservation maintenance will be implemented by the NPS with a concentration on exterior elements. Interior elements, however, will be secondary in importance and may be jeopardized. In addition, the structures will be vacant and the risk of vandalism is expected to be relatively high. Major beneficial effects on long-term preservation are expected for structures used for park operations from the full use and regular maintenance of the entire structure.

4.1.6.3.Cultural Landscapes

Mowing to maintain open fields promotes the rural character of the rural landscape despite its lack of agricultural activity. Land use patterns, spatial relationships, and fields as character-defining features are retained to promote a rural appearance and, in turn, the rural character of the landscape is portrayed. Thus, this land use will have only a minor beneficial effect on the rural character of the landscape at the farm and park-wide scales since the historic activity is absent.

Existing structures would mostly be used as scene-setters or for park operations. Scene-setters focus on the role of a structure as a character-defining feature in the rural setting. Any functional use is omitted although the structure helps retain the rural landscape's spatial organization, land use patterns, and visual qualities. Slightly more beneficial effects on structures used for park operations are expected, as they will be accompanied by a compatible use. Structures under both of these uses will have a moderate beneficial effect on the rural character of the landscape at a farm and park scale.

The curtilage around scene-setters and structures used for park operations would be mowed to maintain open space patterns and exhibit small scale features and planted vegetation. An agricultural function would be absent, however. Thus, the benefits to the rural landscape character are expected to be moderate at both the farm and park levels.

As in Alternative 1, little new construction is expected in the form of structures or fences under this alternative. Thus, no change in land use patterns, spatial relationships, or visual appearances are likely to occur and negligible impacts on the historic character of the rural landscape at the farm and park scale are expected.

4.1.6.4.Cumulative Impacts

No cumulative impacts specific to this alternative are expected except those previously noted as common to all alternatives.

4.1.6.5.Conclusion

Impacts on archeological resources from these activities are expected to be negligible to minor due to limited agricultural uses and little or no new construction. Occasional utility installation may occur with negligible to minor adverse impacts on archeological resources. In comparison to the other alternatives, this alternative is expected to have the least adverse impact on archeological resources.

Moderate beneficial effects to the historic character of structures used as scene-setters are expected as exterior façades are protected, but interior elements may be at risk. Structures used for park operations will also have moderate beneficial effects on the historic character of a structure. The historic character of structures is not portrayed as well as in Alternative 2, since historical uses are absent.

The use of most historic structures as scene-setters will have moderate beneficial effects on their long-term preservation potential. In some cases where structures are in full active use, major beneficial effects on long-term preservation potential are expected for structures from the full use and regular maintenance of the entire structure. Therefore, the beneficial effects on the long-term preservation potential of historic structures as an entire resource is less than Alternative 2, but greater than Alternative 1.

The mowing of fields has a minor beneficial effect on the rural character of the landscape. The mowing of curtilage lands and the use of structures, whether as scene-setters or for park operations, will have a moderate beneficial effect on the rural character of the landscape at a farm and park scale. This alternative portrays the least amount of historic rural character of any alternative due to limited compatible and historical uses.

The implementation of this alternative is not expected to lead to an impairment of the cultural resources of Cuyahoga Valley National Park.

4.1.7. Impacts of Alternative 4 – NPS Farming

4.1.7.1.Archeology

As in Alternative 1, moderate adverse impacts on archeological resources are expected from equipment damage and surface exposure caused by conventional cultivation. Adverse impacts from compaction and erosion caused by grazing are expected to be negligible to minor as livestock grazing levels are expected to be low under this alternative. Should livestock uses unexpectedly increase, related impacts could increase.

As in Alternatives 1 and 3, very little new construction and utility installation is expected under this alternative. Adverse impacts on archeological resources from these activities are expected to be negligible to minor.

4.1.7.2.Historic Structures

For the same reasons as stated in Alternative 3, structures used as scene-setters are expected to have moderate beneficial effects on the historic character of structures. Structures used for NPS farming activities, however, will have major beneficial effects on the historic character of structures as full agricultural use will be implemented.

It is expected that scene-setter use will have moderate beneficial effects on the long-term preservation potential of historic structures as in Alternative 3. Structures used for NPS farming are expected to have major beneficial effects on the long-term preservation potential.

4.1.7.3.Cultural Landscapes

As in Alternative 1, lands already used for agricultural activities, will have major beneficial effects to the rural character at the farm and park levels.

Structures used as scene-setters will have moderate beneficial effects on the rural character of the landscape at the farm and park levels as in Alternative 3. Similarly, the associated mowed curtilage will also have moderate beneficial effects. When structures are used to support NPS farming activities, however, moderate beneficial effects on the

rural character are expected at both levels. However, the structures used for NPS farming will primarily be barns or other outbuildings. It is not likely that all structures that compose a farmstead will be used so these benefits are less than in Alternative 2.

When structures are used to support NPS farming activities, it is also assumed that at least some portion of the surrounding curtilage will be used to support farming as well. Thus, moderate beneficial effects on the rural character of the landscape are also expected at the farm and park scales.

As in Alternatives 1 and 3, the limited new construction will result in negligible impacts on the historic character of the rural landscape at the farm and park scale.

4.1.7.4.Cumulative Impacts

No cumulative impacts specific to this alternative are expected except those previously noted as common to all alternatives.

4.1.7.5.Conclusion

Adverse impacts on archeological resources from tilling are expected to be moderate in this alternative. This alternative will have the greatest amount of adverse impacts on archeological resources due to the increased amount of conventional farming. As in Alternatives 1 and 3, little or no new construction and even less utility construction is expected under this alternative so resulting impacts on archeological resources would be negligible.

Impacts on historical structures are similar to Alternative 3. The use of structures for NPS farming purposes, however, is expected to have additional major beneficial effects on historic character. More structures are in a highly compatible use in terms of historic character than Alternatives 1 and 3, but less than in Alternative 2.

This alternative is expected to have a greater overall benefit to the long-term preservation potential of historic structures as an entire resource than Alternatives 1 and 3, but less than Alternative 2 since many structures will not be in full use.

Major beneficial effects to the rural character of the landscape at a farm and park-wide scale are expected from agricultural activities occurring in the fields. The agricultural activities, use of structures, and some connected uses of lands with structures will result in moderate beneficial effects. This alternative portrays rural character of the landscape better than Alternative 3, where agricultural use is absent, but less than in Alternative 2 because entire farms are not functionally united for agricultural purposes and many structures are used for scene-setter purposes.

The implementation of this alternative is not expected to lead to an impairment of the cultural resources of Cuyahoga Valley National Park.

4.1.8. Irreversible or Irretrievable Commitments of Resources

Some irretrievable loss of *in situ* archeological resources through ground disturbing activities is expected to occur under any of the alternatives. However, since site level NEPA and historic preservation compliance will be conducted it is expected that losses would be minimized. Discovered resources would be collected, evaluated, and recorded using National Register criteria. Research potential is high as well as use for park interpretation programs and public enjoyment.

If structures are not readily put into active use (especially in Alternative 1), it is possible that historic structures may experience irretrievable losses to significant character defining features from deterioration or destruction from natural processes or human factors such as vandalism. Such losses may similarly affect cultural landscapes to which these structures contribute.

Similarly, in all alternatives (especially Alternatives 3 and 4) when structures are used as scene-setters, it is possible that significant character defining features of interior elements will be irretrievably lost.

4.1.9. Loss In Long-Term Availability or Productivity of the Resource to Achieve Short-Term Gain

There is an anticipated loss in the long-term availability of *in situ* archeological resources from the ground disturbing activities expected to occur under any alternative. These impacts are largely minimized because discovered resources would be collected, evaluated, and recorded using National Register criteria. Thus, the resources would potentially exist *ex situ* for perpetuity contributing to research, park interpretation programs and public enjoyment. Known archeological resources that remain in their place of origin would be avoided or protected. Where this is not possible, mitigation measures will be implemented.

In Alternative 1, there is a risk of loss in the long-term availability of fields as rural landscape elements if they are not maintained and succession is allowed to occur. It is unlikely that such fields would actively be reclaimed.

4.1.10. Unavoidable Adverse Impacts

Unavoidable minor to moderate adverse impacts on archeological resources are expected to occur from certain ground disturbing activities under all alternatives. Such impacts will be minimized and largely mitigated through site level NEPA and NHPA compliance. As guided by National Register criteria and Cultural Resources Management Guideline (NPS

1997a), mitigation measures for cultural resources would be implemented when it is not possible to protect known archeological resources, historic structures, and cultural landscapes and an adverse impact is expected. Mitigation measures typically consist of data recovery and detailed recording. Data recovery projects will be designed in consultation with the State Historic Preservation Office and will conform to NPS and professional standards.

4.2. IIMPACTS ON VEGETATION

This section of the EIS analyzes the potential impacts associated with each of the alternatives with regard to the vegetation growing in the proposed fields and the adjacent forested areas which could be affected by the management of the fields.

4.2.1. Regulations and Policies

NPS *Management Policies* (NPS 2001e; Section 4.4.2.1) provides guidance on the removal of plants from parks. It states that when the NPS allows the removal of plants for any authorized action, the NPS will seek to "ensure that such removals will not cause unacceptable impacts on native resources, natural processes, or other park resources". Additionally, the NPS "will manage such removals to prevent them from interfering broadly with: Natural habitats, natural abundances, and natural distributions of native species and natural processes; Rare, threatened, and endangered plant or animal species or their critical habitats; Scientific study, interpretation, environmental education, appreciation of wildlife, or other public benefits; Opportunities to restore depressed populations of native species; or Breeding or spawning grounds of native species".

Executive Order 13112 requires that federal agencies act to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. NPS Management Policies (NPS 2001e; Section 4.4.4) require that exotic species not be allowed to displace native species if displacement can be prevented. Control is indicated by the management policies if control is prudent and feasible, and the exotic species: Interferes with natural processes and the perpetuation of natural features, native species or natural habitats; or Disrupts the genetic integrity of native species; or Disrupts the accurate presentation of a cultural landscape; or Damages cultural resources; or Significantly hampers the management of park or adjacent lands; or Poses a public health hazard as advised by the U.S. Public Health Service (which includes the Centers for Disease Control and the NPS Public Health Program); or Creates a hazard to public safety. NPS policies also require that control of invasive plants be managed to avoid causing significant damage to native species, natural ecological communities, natural ecological processes, cultural resources, and human health and safety.

Consistent with these guiding principles, non-native invasive plants on federal land within CVNP are managed under a Control Plan for Alien Plants (NPS 1990). This plan sets forth a framework for inventorying, monitoring and managing invasive plants with the objectives of identifying sites being invaded by invasive plants; to generally quantify and qualify the extent of invasion; to provide baseline data for selection of appropriate control measures; and to establish an ongoing monitoring program for the continued evaluation of threats. Specific actions taken under this plan have included inventory, monitoring, and control of a variety of invasive species.

4.2.2. Methodology

A qualitative assessment of impacts on terrestrial vegetation was conducted based on literature review, site inspection, geographic information system (GIS) analysis, and existing natural resources data. No original data collection was undertaken in connection with this portion of this EIS. Impacts on aquatic vegetation are analyzed along with water resources in Section 4.4.

In evaluating the impacts on terrestrial vegetation, several topics related to potential impacts were considered: endangered plants and critical habitat, loss of native vegetation, invasive plants and hybridization, arrested succession and removal of habitat, edge effects, and fragmentation. Because the impacts of the proposed alternatives are incremental over a 10-year period, it is difficult to quantify impacts at each increment of the program. Thus, impacts were analyzed in terms of total anticipated changes from existing conditions after 10 years.

The level of impact for each of these topics is directly related to the type of management undertaken under each alternative. Management activities that involve soil disturbance increase the possibility of spreading invasive plants. Crop operations, which involve plant species that may hybridize with native plant species, will increase potential impacts due to hybridization. Activities that include the use of pesticides or organic or chemical fertilizers will have greater impacts on the surrounding vegetation. Management activities that include livestock will have potential vegetation impacts due to grazing and trampling, which includes increased spread of invasive plants, while those that do not include as much livestock will have less potential for this type of impact.

It is acknowledged that the project area includes fields in a continuum of successional stages. For the purpose of this analysis, these were generalized into two broad groups. It was assumed that currently unmanaged fields that had been recently farmed or are currently grassy with little woody vegetation would be impacted similarly to currently managed fields. All are therefore discussed as “open fields”. The “older fields” that have proceeded further into succession would experience a broader range and intensity of impacts.

4.2.3. Impacts Common to All Alternatives

Threatened and Endangered Plant Species. Before active management is initiated on any field, field visits will be conducted which will include screening for the presence of rare plants. If rare plants are found in any field during that review, appropriate steps will be taken to ensure protection of the rare plant population.

No federally-listed endangered or threatened plant species are known to exist within the park and no Critical Habitat has been designated. Northern monkshood (*Aconitum noveboracense*) has not been found within the park and is unlikely to be associated with agricultural fields. Hence, no impact on federally-listed plant species is expected.

With one exception, no plants listed by the State of Ohio as potentially threatened, threatened, or endangered are known to occur within the proposed agricultural lands. There is one field that is adjacent to a small population of the potentially threatened species, butternut (*Juglans cinerea*), which could be adversely impacted by plowing within the root zone or by physical damage from farm machinery or animals. Should this field be used, the root zone of the trees would not be plowed, and the trees would be protected from livestock by fencing. Therefore, no impacts on Ohio-listed rare plant species are expected.

Loss of Native Vegetation. Since the proposed agricultural land identified in this document will be managed to preserve the rural landscape, the natural vegetation will be impacted on that land. The "open fields" (1,083 acres) are in many cases already in altered states of succession. The "older fields" (262 acres) will generally be cleared of their successional plants, and thereafter will be managed to prevent succession, either by mowing or farming. The impact of management will be that most native plant growth will be destroyed or altered towards a monoculture of grasses or some crop mix.

The adverse impact on the actual native vegetation within the proposed fields will be major, as most or all populations of native vegetation in these fields will be lost or altered. However, the removal of the vegetation in these areas will be a minor impact on the park's overall vegetation when considered at the park-wide scale, due to the small amount of acreage affected.

Plant Hybridization. Crops and domestic plants may interbreed with the native flora. In general, common agricultural crops such as fruit, vegetables, and herbs may be grown, along with more invasive crops. However, the particular crops that will be grown on each of the farmsteads are not currently known. In general, the common crops pose little risk of hybridization with native plants. Given that all crops that may be grown are carefully evaluated for potential to hybridize before they are introduced into the park, risks of invasive species introductions are considered minimal. Overall, the anticipated adverse impacts are considered minor.

Arresting Succession. All alternatives have the potential to broadly interfere with the natural process of succession of plant communities from field to forest. This is slightly less likely under Alternative 1 because some fields are likely to undergo succession before being managed. In the absence of management, all fields in the park would be expected to undergo succession and become forests. However, this natural elimination of all early successional habitats ("older fields") would take decades. Any of the alternatives under the proposed action would accelerate the elimination of early successional habitats and shrubby areas.

The impacts associated with arresting succession include alteration of soil chemistry and plant communities, both through the loss of native vegetation and through increased light, heat, and wind exposure that decreases the moisture content of the soil for many years. Moisture changes affect other chemical and physical attributes of the soil. After farming

for an extended period of time, succession may not proceed as rapidly, or in the same direction as it would have in the absence of farming. While many fields already face this impact from previous uses, all alternatives propose to expand these impacts on other areas that have been recovering from past uses for up to 15 years.

These adverse impacts of all alternatives on the process of succession are expected to be minor to moderate, spatially broad, and long-term. The level of impact is somewhat lessened by the fact that these impacts on successional processes can be temporary if rural landscape management would cease. However, the effects of arresting the process of succession are long-term impacts because they will continue for a significant period of time after management ends.

Edge Effects and Fragmentation. The impacts of habitat fragmentation and increased edge effects on biodiversity are well documented (e.g., see summaries in Meffe and Carroll 1994). Such impacts are expected on native vegetation under the proposed action. When fields are cleared, the boundary between the field and the adjacent forested area become more distinct, allowing for changes in the physical and ecological attributes of those edge areas. The permanent clearing of fields will lead to increased light, wind, and water penetration into adjacent forest edges. This will result in forest edge effects such as a higher density of saplings, more shrub cover, adventitious limbs on overstory trees, and an increase in plants more typical of open areas. Species composition in forest edges may shift away from shade-tolerant species that do not compete well in direct sunlight toward more shade-intolerant plants (Matlack 1994). This effect proceeds into the forest on a gradient diminishing with distance and will be most apparent in the five meters nearest the proposed fields.

These adverse edge effects are expected to be negligible to minor in forests adjacent to the fields of CVNP, considering the current state of these areas. Edge effects are already readily apparent as the current “open fields” have been managed, manipulated, or disturbed in recent times. On the “older fields”, some of which appear to have been undisturbed for approximately 15 years, edge effects are still apparent although not as pronounced as on the more “open fields”. Hence, continued management of the “open fields” would result in only negligible adverse impacts due to changes in edge effects, while renewed management on “older fields” would result in minor adverse impacts due to edge effects.

The introduction and spread of non-native invasive plants is often associated with edge effects. While there is some evidence in the literature to suggest this is true, not all studies have so concluded (Matlack 1994). Invasive plant issues will be analyzed separately in the following sections.

Fragmentation of habitat can be a concern for populations of some native plant communities. The effects of continued fragmentation on plant communities, factors such as increased light penetration, smaller patch size, and lower soil moisture, can alter the habitat enough to make the affected area unsuitable for the plants growing there. When this happens, plants more adapted to the new conditions move in. This results in a gradual

change in the species composition in the affected area. Also, some plants have been shown to need large areas of continuous tree canopy to properly reproduce and thrive (Jules 1998).

Arresting succession in the proposed agricultural lands would maintain the current fragmentation levels of forested areas adjacent to the fields. If succession were permitted to occur naturally, many small gaps in forest cover would eventually become closed. Additionally, the clearing of the "older fields" would result in increased fragmentation of plant communities within successional habitats. These adverse effects of fragmentation are expected to be negligible to minor. None of the impacts common to all alternatives are expected to lead to an impairment of the natural vegetation of Cuyahoga Valley National Park.

4.2.4. Cumulative Impacts Common to All Alternatives

Any future actions to reduce the deer herd in CVNP (as discussed in Section 4.2.6.1) may reduce deer impacts on vegetation under all alternatives.

4.2.5. Impacts of Alternative 1 - No Action

4.2.5.1.Direct and Indirect Impacts

Areas adjacent to agriculture in the park will be at risk for the introduction of exotic plants, whether through escapes from cultivation, seeds in organic materials brought in from other sites as feed or crops, or other accidental introduction into the natural ecosystem. These exotics could include invasive plants that may be difficult to control.

A major factor that contributes to the spread of invasive plant populations is soil disturbance. Such disturbances allow seeds or parts of plants (which can spread vegetatively), to establish new or expanded populations. Agricultural activities that involve soil disturbance, such as plowing, livestock grazing or movement, or construction of new buildings could lead to the establishment or spread of non-native invasive plants. Non-native invasive plants displace native plants, often forming monocultures. They are often of limited wildlife value, and they decrease the species diversity of the area invaded.

Since the emphasis of this alternative is on conventional farming through SUPs, which often includes plowing of fields and other disturbances, these adverse impacts are expected to be moderate under Alternative 1. Negligible impacts are expected when fields are mowed or hayed.

Vegetation and soil may also be disturbed or trampled by movement of domestic animals. This includes vegetation in the fields and along movement corridors as animals are

moved from pasture to pasture, barn to pasture, or pasture to barn. The limited amount of livestock expected under this alternative would cause negligible impacts.

Impacts on the vegetation in areas adjacent to managed fields are expected. These impacts will vary depending on the management of a given field. If a field is row cropped, erosion and possibly greater nutrient runoff could create more lush growth, a build-up of eroded soil deposited near obstacles to water flow, or other impacts. If a field is grazed, impacts may be limited to occasional browsing across the fence by livestock, and nutrient loading from manure. Nutrient flows could indirectly change the soil chemistry in nearby areas over time. This change could alter the species composition over time, replacing current vegetation with that which thrives in the newly created conditions.

As this alternative is likely to include uses of conventional fertilizers and pesticides and some livestock grazing, nutrient flows and potentially pesticide residues are expected to flow into the surrounding soil. Overall, adverse impacts on vegetation in surrounding areas are expected to be moderate adjacent to crop and livestock fields.

Any additional indirect impacts on park forests due to anticipated changes in deer distribution and habitat availability will be negligible under this alternative.

4.2.5.2.Cumulative Impacts

No cumulative impacts specific to this alternative are expected except those previously noted as common to all alternatives.

4.2.5.3.Conclusions

Agricultural activities that involve soil disturbance, such as plowing, livestock grazing, or construction of new buildings could lead to the establishment or spread of non-native invasive plants resulting in moderate adverse impacts. Negligible impacts from animal movements or trampling are expected. Adverse impacts on vegetation surrounding agricultural lands from nutrient and pesticide flows are expected to be moderate adjacent to crop and livestock fields. Impacts on forests relating to deer are considered negligible. The implementation of this alternative is not expected to lead to an impairment of the natural vegetation of Cuyahoga Valley National Park.

4.2.6. Impacts of Alternative 2 - Countryside Initiative (Preferred Alternative)

4.2.6.1.Direct and Indirect Impacts

Risks from the spread of invasives are similar but less significant than in Alternative 1. Sustainable practices such as no-till planting and the use of cover crops would result in limited soil disturbance, resulting in a negligible risk of spreading invasive species.

However, the wider variety of specialty crops that will likely be grown under this alternative may result in a slight increase in the potential risk for escapes. Increased amounts of livestock feed also slightly increase this risk. Overall, minor to moderate adverse impacts from the spread of invasives are expected under this alternative.

Since this alternative will likely include more livestock than Alternative 1, it is likely that increased trampling of vegetation and soil disturbance will occur. The additional trampling of vegetation by livestock is expected to be negligible within actual proposed fields. However, on the pathways between fields, trampling will occur which will result in destruction of some vegetation. Additionally, if livestock is moved through these areas during wet periods, it is likely that greater trampling will occur as pathways widen due to the livestock avoiding standing water which may pool in some areas. Trampling during wet weather increases soil compaction, which may inhibit the reestablishment or continued growth of plants in the pathways between the fields. Moving livestock during wet periods could also exacerbate soil disturbances, creating conditions in which invasive plants could become established. This may increase the risk of invasive plants spreading, and lead to minor vegetation destruction. Related adverse impacts under this alternative are expected to be minor.

As non-chemical fertilization and biological pest control is more likely to occur under this alternative, as well as the fact that the land will be managed in an integrated manner, it is likely that impacts on surrounding vegetation will be negligible to minor.

As discussed in Section 4.3.6, this alternative is likely to exclude white-tailed deer from much of the prime deer foraging habitat in the park because of the increased fencing associated with this alternative. As deer populations shift in response to the altered conditions under this alternative, increased browse pressure is likely to result in moderate adverse impacts on the forests of the park and surrounding landscape by exacerbating current conditions. Although deer browsing pressure can be expected to decrease over time due to increased starvation and decreased populations of deer under this alternative, the indirect impacts of high levels of browsing during the time it takes for that decrease to occur are likely to be much longer lasting than the direct impacts of increased browsing itself.

Upland forests, which already have a sparse understory and may already be experiencing decreases in species diversity due to deer (NPS 2001c), will be impacted even more by the deer population shifts caused by this alternative. Sensitive species susceptible to browse by deer, such as *Trillium grandiflorum*, which is currently experiencing a loss of reproduction due to deer (NPS 2001g), may become rare or extirpated from the park under this alternative. Moderate adverse impacts would be expected; loss of these species would constitute a major adverse impact.

Bottomland forests, where tree seedlings are currently not able to advance into taller height classes due to deer browsing (NPS 2001c), will likely experience a decrease in seedling numbers over time, which will exacerbate the low recruitment currently besetting these forests. This would result in moderate adverse impacts on these forests.

A possible long-term result may be the failure of forest regeneration in the bottomland forests of CVNP, resulting in a loss of forest cover once the existing overstory trees die. Should this effect occur it would be a major adverse impact and could lead to an impairment if not properly mitigated.

In upland and bottomland forests, deer browsing causes decreases in the vertical structure of the forests (NPS 2001c). Vertical structure is the natural vegetation growing at various heights in the forest, which is used as habitat, food, and cover for animals. Increased deer browse under this alternative is expected to adversely impact the vertical structure of the forests of CVNP. The adverse impacts of this reduction in vertical structure are likely to be moderate.

4.2.6.2.Cumulative Impacts

No cumulative impacts specific to this alternative are expected except those previously noted as common to all alternatives.

4.2.6.3.Conclusions

Minor to moderate adverse impacts from the spread of invasives are expected under this alternative. These impacts are less than in Alternative 1 due to an expected reduction in overall soil disturbances under sustainable practices. Negligible to minor adverse impacts on vegetation from livestock movements, especially in animal movement corridors between fields are expected. Adverse impacts on vegetation surrounding agricultural lands from nutrient and pesticide flows are expected to be negligible to minor since natural fertilizers and pesticide use is expected. Moderate adverse indirect impacts caused by increased deer browsing in forests are expected on forest groundcover species diversity, forest regeneration and, vertical structure. The possible loss of some sensitive understory species would be a major adverse impact if it occurred. This alternative also could exacerbate current conditions possibly leading to the failure of tree regeneration in bottomland forests. This adverse impact, should it occur, could lead to an impairment if not properly mitigated. The implementation of this alternative is not expected to lead to an impairment of the natural vegetation of Cuyahoga Valley National Park.

4.2.7. Impacts of Alternative 3 - Vista Management

4.2.7.1.Direct and Indirect Impacts

Since farming is very limited under this alternative, it is likely that impacts associated with soil disturbance, such as invasive species colonization, will not occur or be negligible due to the activity. The effects of livestock trampling, such as vegetation destruction, soil compaction, and soil disturbance will also be less likely under this

alternative. Impacts due to introduction and spread of invasive plant species are expected to be negligible under this alternative.

The vegetation surrounding managed areas is unlikely to be impacted to any great degree under this alternative beyond the edge effects discussed in impacts common to all alternatives, since no additional nutrient loading or erosion potential is normally associated with mowing. The adverse impact on surrounding vegetation is expected to be negligible under this alternative.

Indirect impacts on park forests due to anticipated changes in deer distribution and habitat availability will be negligible under this alternative.

4.2.7.2.Cumulative Impacts

No cumulative impacts specific to this alternative are expected except those previously noted as common to all alternatives.

4.2.7.3.Conclusions

Most impacts associated with agricultural uses are absent from this alternative. Any impacts on native vegetation are considered negligible. Expected impacts on native vegetation are lowest among the alternatives. The implementation of this alternative is not expected to lead to an impairment of the natural vegetation of Cuyahoga Valley National Park.

4.2.8. Impacts of Alternative 4 - NPS Farming

4.2.8.1. Direct and Indirect Impacts

Under this alternative, similar impacts on those in Alternative 1 are expected for lands farmed under SUPs. However, for lands managed for agriculture by NPS employees or contractors, impacts on vegetation would be significantly reduced. NPS farmers would use few fertilizers or pesticides. The NPS would only plant species and varieties known to be non-invasive. Additionally, few livestock are expected under this alternative. Additionally, larger buffers could be applied to be more protective of natural resources than in those instances where the natural resource issues must be balanced against a farmer's need for economic sustainability (as in Alternatives 1 and 2). Therefore, all impacts on vegetation related to these activities are considered negligible for the lands that are NPS-farmed. Overall adverse impacts for all farmed areas from the spread of non-native invasive plants and on vegetation adjacent to crop and livestock fields are expected to be less than in Alternative 1; minor to moderate adverse impacts are expected. Negligible impacts are expected on areas that are hayed.

Indirect impacts on park forests due to anticipated changes in deer distribution and habitat availability will be negligible under this alternative.

4.2.8.2. Cumulative Impacts

No cumulative impacts specific to this alternative are expected except those previously noted as common to all alternatives.

4.2.8.3.Conclusions

Overall adverse impacts from the spread of non-native invasive plants and on vegetation surrounding adjacent crop and livestock fields are expected to be minor to moderate under this alternative. Negligible impacts are expected on areas that are hayed. Negligible impacts from animal movements and deer browsing are expected. The implementation of this alternative is not expected to lead to an impairment of the natural vegetation of Cuyahoga Valley National Park.

4.2.9. Irreversible or Irretrievable Commitments of Resources

Populations of sensitive understory species, such as *Trillium grandiflorum*, may be locally extirpated from the park, if there is a dramatic increase in deer browsing. This may be an irreversible impact, as the species may not easily recolonize.

4.2.10. Loss in Long-term Availability or Productivity of the Resource to Achieve Short-term Gain

The possible failure of forest regeneration in the bottomland forests of CVNP may result in a loss of forest cover once the existing overstory trees die, making that resource unavailable until positive recruitment is restored and mature forest is reestablished. This could lead to an impairment of natural resources if not adequately mitigated.

4.2.11. Unavoidable Adverse Impacts

The loss of native vegetation of the proposed fields will have major adverse impacts at the field level, as most native vegetation in these fields will be destroyed. This loss is a minor impact on the park's vegetation when considered at the landscape level. Minor adverse impacts from possible crop hybridization with native plants are expected. Adverse impacts on vegetation from arresting the process of succession are expected to be minor to moderate, spatially broad, and long-term. Minor adverse impacts from increased edge effects and maintained habitat fragmentation are expected.

4.3. IMPACTS ON WILDLIFE

4.3.1. Summary of Regulations and Policies

It is policy of the NPS to preserve natural resources in their "natural condition." Natural condition is defined as "the condition of resources that would occur in the absence of human dominance over the landscape" (NPS 2001e; Chapter 4, p 28).

NPS Management Policies (NPS 2001e, Chapter 4) direct the NPS to preserve and restore native plants, animals, and their communities and ecosystems, as well as biological processes including succession. This includes preserving and protecting "natural abundances, diversity, dynamics, distributions, habitat and behaviors..." as well as by "minimizing human impacts on" native plant and animal populations (Section 4.4.1). Management Policies (Section 4.1.5) also compel the NPS to restore natural conditions and processes to human-disturbed lands. Natural conditions include soundscapes (Section 4.9) as well as other conditions associated with biological resources. Domestic livestock and other exotic species are permitted (Section 4.4.4.1), so long as they are managed to prevent unacceptable impacts on park natural resources.

Executive Order 13186 (Responsibilities of Federal Agencies to Protect Migratory Birds) directs Federal agencies to avoid taking actions that have a measurable negative effect on migratory bird populations. If such actions are taken, the EO directs agencies "to develop and implement within two years a Memorandum of Understanding with the U.S. Fish and Wildlife Service that shall promote the conservation of migratory bird populations". This EO also defines migratory bird "species of concern" as "those species listed in the periodic report Migratory Nongame Birds of Management Concern in the United States, priority migratory bird species as documented by established plans [such as Bird Conservation Regions in the North American Bird Conservation Initiative or Partners in Flight physiographic areas], and those species listed in 50 CFR 17.11 [Endangered Species Act]".

The ESA directs federal agencies to assess the effects of their proposed actions on threatened and endangered species and critical habitat, and requires consultation with the U.S. Fish and Wildlife Service if an effect is anticipated.

4.3.2. Methodology

Impacts of the proposed action to wildlife were assessed primarily in terms of potential effects on (1) amount and quality of wildlife habitat, (2) distribution of animals, and (3) levels of direct disturbance (e.g., harassment, mortality) to species. Methods employed in this assessment included determining which species were most likely to be present in areas affected by the alternatives, habitat requirements of potentially affected species, existing amounts and quality of habitats for these species within the park, and ecological relationships among potentially affected species (when possible). Analyses relied upon NPS inventory, monitoring, and research data, scientific literature, and professional

knowledge about individual species biology and habitat requirements. Impacts on nuisance wildlife themselves are assessed, but the human component of the equation (how humans are impacted by nuisance wildlife responses) is addressed in Section 4.5. Impacts on wildlife associated with farm ponds are examined in Section 4.4 - Impacts on Water Resources.

Because the impacts of proposed alternatives are incremental over a 10-year period, it is difficult to quantify impacts at each increment of the program. Thus, impacts were largely analyzed in terms of total anticipated changes from existing conditions after 10 years. Furthermore, because of the complex, dynamic nature of both the land ownership matrix within and outside of CVNP and of wildlife populations in a human-dominated landscape, it is difficult to accurately predict and quantify all potential impacts of the proposed actions on all potentially affected wildlife over 10 years. Therefore, in this analysis, impacts on wildlife are assessed in terms of likely worst-case scenarios. Toward that end, one assumption for this analysis is that all acreage proposed for each alternative would be completely utilized for the purposes described and in the proportions described. It is also assumed that all of the "older field" habitat with significant shrub/sapling growth that is currently unmanaged would be used or managed under the alternatives.

4.3.3. Impacts Common To All Alternatives

Federally-threatened and Endangered Animal Species. Before active management is initiated on any field, a field visit will be conducted which will include general screening for the presence of federally-listed species or their habitats.

The proposed action does not directly affect Indiana bat roosting or foraging habitat. Agricultural activity is relegated only to relatively open space with appropriate protective buffers to both wetlands and riparian areas. No large-scale removals of mature trees or impacts to forests are planned under any alternative. It is possible that the removal of individual potential roost trees may be required when such trees pose a safety hazard or threaten agricultural infrastructure. However, the NPS will follow USFWS guidelines on the assessment and removal of such trees. Whenever possible, trees exhibiting roost characteristics (exfoliating bark, cavities) will not be cut during the Indiana bat roost period of April 15th – September 15th. If this schedule cannot be followed, then bat surveys will be conducted to assess the presence of Indiana bats before trees are removed. No impact on the Indiana bat is expected from the proposed action.

There is no expectation that the federally-threatened bald eagle would be affected by the proposed action as the bird occurs so infrequently as a transient. The eastern massasauga (an ESA candidate for listing) has not been recorded in the park. No impacts on these species are expected.

Should any other populations of federally-listed species ever be discovered in the park, the NPS will coordinate with the U.S. Fish and Wildlife Service as required under the ESA to protect the species from any impacts associated with this or other NPS actions.

Impacts on state-listed threatened and endangered bird species are discussed in the following wildlife impact analyses.

Habitat Loss. All alternatives involve clearing and maintaining open areas, some of which have begun to succeed into a young forest habitat. By impeding and, in some cases, reversing forest succession, current forest fragmentation and edge effects are maintained and in many cases amplified. The impacts of habitat fragmentation and increased edge effects on biodiversity are well documented (e.g., see summaries in Meffe and Carroll 1994). Forest gaps that would have naturally closed will be kept open. "Older field" boundaries that provide a transition zone between habitats will be removed reestablishing clear forest-field boundaries. These effects will cause additional moderate adverse impacts on forest interior wildlife species, particularly birds, which require larger tracts of habitat for successful breeding. Increased amounts of distinct edge habitat will continue to enhance populations of generalist species such as raccoons, crows, and brown-headed cowbirds. While these generalist species will experience minor beneficial effects, they prey on bird nests and can lower nesting success to the extent that bird populations are non-sustaining, possibly leading to local extirpations.

The loss of 41 percent of the "older field" habitat (262 acres) in CVNP through clearing would have adverse impacts on terrestrial birds, small mammals, and butterflies that require that habitat type. Most animal species found in "older fields" are generalists that also occur in older or younger successional stages, so adverse impacts from the proposed action would be expected to be minor for populations of these species. However, a few species that are highly dependent on "older fields", such as the golden-winged warbler (*Vermivora chrysoptera*), a bird species of high conservation priority (Hunter et al. 1993) in the region, could experience a higher level of impact. The continued loss of "older fields" over time to successional growth will likely exacerbate the adverse impacts of the proposed action.

To help mitigate these impacts, a significant portion of the "older fields" has been intentionally left in the landscape, including the preservation of some of the largest tracts available (several 50-acre blocks) on federal land. As an additional required mitigation measure, the park will develop a Habitat Management Plan for shrub and other "open field" habitats within 5 years. A full review and assessment of appropriate park habitat management options is needed to complete this task. The park will evaluate the desired successional stages, total acreage, landscape distribution, temporal management regimes, and available tools for managing these habitats and balance the benefits of preserving rare habitats with the adverse effects of arresting succession (i.e., edge effects and fragmentation). Such a plan will identify park goals and areas for maintenance as shrub habitats. Grassland habitat management efforts also will be formalized in that document. These habitat management efforts are in compliance with guidance provided in EO 13186. Management plans will reflect any additional NPS guidance related to this EO as it becomes available. Appropriate NEPA compliance and environmental analysis will be required for such a plan.

Pesticides and Herbicides. Changes in pesticide use could have beneficial or adverse effects on wildlife. The effects on insects and insect larvae would be most direct, but would be negligible for most park insect populations, as insects are typically wide-ranging. Insectivorous wildlife species such as birds and small mammals may also be affected. Since most insecticides would be expected in corn crops (Table 2.2), the greatest effect would be to depress food availability for some birds and mammals. Use of herbicides in these crops would have little impact on most wildlife species. Impacts of the use of pesticides and herbicides would be limited and localized, having negligible impacts on the populations of affected species.

Important Bird Area designation. None of the alternatives would be likely to threaten the IBA designation of CVNP because the designation is based on the total amount and overall quality of habitats present as well as on the potential for management to conserve birds. Total amounts of forest and wetland habitats alone would qualify the park as an IBA. However, Alternative 3 would be likely to improve the conservation value of the park for birds by maintaining or managing more areas as grassland and old field habitat for many species of concern.

None of the impacts common to all alternatives are expected to lead to an impairment of the wildlife resources of Cuyahoga Valley National Park.

4.3.4. Cumulative Impacts Common To All Alternatives

As areas outside of CVNP in surrounding counties become more developed and lose forests and other greenspace, forest and other natural habitats within CVNP will become increasingly isolated. Amplified fragmentation effects on habitats within CVNP due to the proposed action, coupled with isolation, will further degrade the quality of forest habitats for forest dependent species. Continued overabundance of deer and related overbrowsing of forest would exacerbate this condition. Local extirpation of sensitive forest species (e.g., Kentucky warbler (*Oporornis formosus*), ovenbird (*Seiurus aurocapillus*), cerulean warbler (*Dendroica cerulea*) and the Canada warbler (*Wilsonia canadensis*)) currently found in the park could result from these combined conditions. These losses would be considered a major adverse impact.

Any future actions to reduce the deer herd in CVNP may reduce impacts on and related to deer under all alternatives.

The presence of West Nile Virus (WNV) in the region will have a moderate to major negative impact on all bird species, including species of concern. WNV impacts would potentially exacerbate negative impacts of all alternatives on rare or declining bird populations at a local or regional level. Mosquito management by communities surrounding CVNP or by CVNP itself to control WNV could minimize effects of the disease on local birds.

4.3.5. Impacts of Alternative 1 - No Action

4.3.5.1.Direct and indirect impacts

This alternative would increase the amount of agricultural activity in CVNP, primarily through SUPs. White-tailed deer would lose some "older field" (early successional) habitats but these would be replaced in most cases by other suitable (mowed areas) or highly preferred foraging and bedding areas (conventional agricultural fields). Little or no increase in fencing is anticipated under this alternative, so deer and other wildlife would have access to most fields for foraging. Given the same types and proportions of crops as currently exist under SUP (Table 1.1), farms would consist largely of conventional crops such as corn, hay, oats, pumpkins, and soybeans. The increase in fragmentation effects and in availability of high quality forage in these crops would be expected to maintain or enhance population size of the deer herd in CVNP. Thus, the impact of this alternative on the deer population would be beneficial, yet minor.

Attraction of deer, woodchucks, raccoons, and geese to greater amounts of corn or other vulnerable crops under this alternative may cause increased crop damage and greater incidence of harassment of wildlife using auditory devices (e.g., corn cannons) or killing of animals under nuisance wildlife permits on adjacent non-federal land. This localized hunting or harassment likely would have a minor adverse impact on the overall populations of these species.

Total amounts of early successional habitats would be largely maintained and could slightly increase under this alternative. The maintenance of grassland areas through mowing for vista and habitat management will maintain the availability of those habitat types for many rare, sensitive, or declining species, as well as for deer, coyotes, and many raptors that forage or hunt preferentially in those areas. The continued existence and probable increase in numbers of hayfields among SUP holders would provide additional suitable habitat for grassland species. Management of some the largest and highest quality grassland areas specifically for habitat value will maintain and increase the value of those areas. Quality of those early successional habitats would vary depending on size of tracts, but overall there would be negligible to minor beneficial effects of this alternative to wildlife of early successional areas.

Although wetland buffers will exist, some agricultural areas near wetlands are likely to be impacted by beaver activities, either from flooding due to damming, or damage to crops and trees. This will increase the occurrence of beaver-human conflicts, possibly resulting in nuisance trapping and killing, relocations, and damage to beaver structures. These impacts are expected to be localized and relatively uncommon, representing only minor adverse impacts on the beaver population.

4.3.5.2.Cumulative Impacts

No cumulative impacts are expected under this alternative beyond those identified as common to all alternatives.

4.3.5.3.Conclusion

Alternative 1 would provide minor benefits to white-tailed deer populations due to increased forage, but these would be offset by impacts from more human conflicts and harassment. Negligible to minor beneficial effects would be provided to grassland and early successional species (including state-listed rare or declining species) due to the maintenance and possible net increase in these habitats. There would be minor adverse impacts on beaver from conflicts with humans. Adverse impacts on coyotes from human-wildlife conflicts would be negligible and for other wildlife would be negligible or minor. The implementation of this alternative is not expected to lead to an impairment of the wildlife resources of Cuyahoga Valley National Park.

4.3.6. Impacts of Alternative 2 - Countryside Initiative (Preferred Alternative)

4.3.6.1.Direct and indirect impacts

Sustainable practices can certainly promote habitat improvements when compared to lands farmed using conventional agriculture practices (e.g., DeVore 2003) and may in certain circumstances be useful to help restore specific habitat values (e.g. Tesauro 2001). However, never is it suggested that sustainable farms in general are replacements for natural, functioning habitats (e.g., see review in McNeely and Scherr 2003). As the majority of land proposed for agricultural use (~1100 acres) is currently either undergoing natural succession or is already minimally-managed by mowing or haying, the overall 'natural condition' of park habitats will not be improved significantly by sustainable agriculture. Therefore, the overall effect of this alternative cannot be viewed as a type of ecological restoration despite the environmentally-friendly practices it promotes as much as a conversion of natural and semi-natural habitats to human use.

Increased agriculture under this alternative presents a different set of impacts on wildlife compared to other alternatives primarily because of the predominant types of agriculture expected and the anticipated significant increase in the amount of fencing.

Because of the desire for economically sustainable farms, and the predominance of mixed crop/livestock operations in this initiative, fencing to exclude deer, coyotes, beaver, woodchucks, and rabbits will be essential. We expect deer exclusion fencing to be a more permanent type of fence around farm perimeters, with other temporary fencing used inside farms to rotate uses. Indeed, all leased field areas being put into active use by the three pilot project farmers have permanent deer exclusion perimeter fencing planned at the time of this writing. Berry crops and orchards also will require netting or other

deterrents of birds during peak ripening periods. Fencing and netting will effectively negate nearly all potential habitat benefits of these areas for wildlife species. While some limited forage will be available in these areas, especially when farmers encourage the presence of birds for pest management or plant feed crops to distract wildlife from more valuable crops, these benefits would be negligible compared to the original amounts, quality, and diversity of forage.

This amounts to a maximum loss of almost 30 percent of all open habitats (1109 acres) within the park. Many of the remaining open habitats are not federally-controlled, and little or no new open unmanaged acreage is expected to arise to mitigate this impact. Additionally, the shift toward crop/livestock farming is expected to result in a decrease or possible absence of significant hay fields among the designated agricultural lands. While over time, a net loss of hayfields is not expected, remaining hayfields would likely be much smaller than the large, consolidated hayfields (>10 acres) existing today. The result would be further reduction in the amount of suitable habitat for grassland bird, mammal, and butterfly species that depend on larger habitat blocks. Thus, the net impact of this alternative would be a net loss of open habitat across the park and a near complete loss or degradation of habitat for most wildlife species in areas under long-term leasing.

This would be a moderate adverse impact on species that require early-successional habitats in the park. The preservation of large grassland areas through habitat management and the exclusion of "older field" habitats with plans to manage and maintain shrub habitats help reduce and mitigate these adverse impacts on species dependent upon these habitats.

Yet, the loss of a large proportion of early successional and agricultural habitats through land conversion and subsequent fencing is expected to affect distribution and movements of white-tailed deer and coyotes. Deer in CVNP do not regularly share small fenced areas with other livestock, even if effective deer fencing is not installed. White-tailed deer will be forced to aggregate more on the few remaining open areas, including residential areas, and will likely browse more in forest habitats. The primary expected effect of the proposed alternative on deer populations would be to remove high-quality forage areas that currently help to sustain them. This will lower the apparent carrying capacity of the remaining landscape, leaving more deer than can be supported. Winter starvation would be expected to increase, as would mortality due to vehicle accidents as deer move more in search of adequate food resources. Increased browse pressure on fewer lands, including residential yards and gardens, will increase the level of deer-human conflicts and may lead to direct killing of problem deer by some private landowners.

Similarly, coyotes will lose many prime hunting areas and, being highly opportunistic, would likely increase use of residential areas for foraging. This would be expected to result in greater incidence of nuisance coyote trapping and killing as well as increased mortality from vehicles.

Thus, reduction in the amount of prime habitat, increased human-wildlife conflicts and traffic mortality for both deer and coyotes is expected to have moderate to major adverse impacts on populations of those species.

Fencing effects on deer and coyotes are somewhat mitigated by the fact that fencing installation will occur gradually over time as farms are established. Thus, populations of these species will be able to adjust distribution gradually rather than being displaced suddenly and completely from all farm areas.

Other species, such as raccoons, woodchucks, skunks, opossums, and geese may also seek other areas for foraging, and exhibit similar tendencies to utilize residential areas more. Again, this could increase human-wildlife conflicts sufficiently for these species to be harassed or killed more frequently. Additional adverse impacts from this alternative to populations of these species would likely be minor, however, given their current status as common nuisance species.

Fencing may present direct hazards to wildlife that become entangled or come in contact with electrified fences. Use of guardian dogs will cause additional direct harassment of wildlife that are attracted to the vegetable and fruit crops, livestock, and poultry present on farms. These impacts are expected to be localized in time and space, however, and would present a minor adverse impact on wildlife populations.

Presence of intensively managed pastures will provide additional foraging habitat for brown-headed cowbirds, which are detrimental to other bird species. However, the relative increase in cowbird habitat would be small and the additional impact on bird populations would be minor. Some raptor species may benefit from an increase in livestock pastures though the preferred management intensive grazing is not expected to allow support of many small mammals or other prey (compared to other grassland or early successional areas), so the benefit to raptors would be negligible.

Direct impacts on beaver populations are expected to be similar to those described under Alternative 1.

4.3.6.2.Cumulative Impacts

Loss of primary foraging areas for white-tailed deer would cause higher browse intensity within forest habitats, further exacerbating impacts on forest structure and habitat quality for forest understory birds and other wildlife. In the absence of deer management in the park, the population would eventually be expected to decrease in accordance with food availability. This would effectively reduce one of the factors contributing to deer overabundance in the park, providing a clear benefit to park ecosystems in the long-term. However, a substantial short-term increase in browsing pressure on forest ecosystems in the park could potentially result in long-term adverse impacts on those resources before natural regulatory processes lowered deer populations. The potential for local extirpations

of sensitive forest species described as common to all alternatives in Section 4.3.4 would bemoderately increased under such increased browsing pressure.

Regional loss of large hayfields, pastures, and other grassland agricultural areas to residential development over time in counties surrounding the park will exacerbate the impacts of habitat loss under this alternative for grassland species within the park.

4.3.6.3.Conclusion

Direct and cumulative adverse impacts on wildlife are greatest under this alternative primarily due to nearly complete loss of habitat in agricultural areas through fencing and wildlife deterrence.

Grassland and early successional birds (including some state-listed rare or declining species), mammals, and butterflies will suffer moderate adverse impacts under this alternative due to net loss of habitat.

White-tailed deer and coyote populations also would encounter moderate to major adverse impacts from loss of habitat and food resources, increased conflicts with humans, and increased vehicle accidents. The cumulative effects of heavy browse pressure of overpopulated deer in forests may result in the loss of sensitive bird species, which would be a major adverse impact.

The implementation of this alternative is not expected to lead to an impairment of the wildlife resources of Cuyahoga Valley National Park.

4.3.7. Impacts of Alternative 3 - Vista Management

4.3.7.1.Direct and Indirect Impacts

This alternative provides the greatest amount of early successional habitat with minimal management through mowing. All areas would be open to wildlife access for food and bedding habitat. Early successional and grassland species would gain moderate to major benefits due to the increased amount of habitat available. Coyotes would gain moderate to major beneficial effects from an increase in good hunting areas.

White-tailed deer would lose some high quality forage currently existing in agricultural lands. This could result in some winter starvation, though this impact would likely be negligible to minor, given the overall increase in successional habitats.

Distributions of deer and coyotes likely would not change and thus human conflicts with these species would either remain the same or probably decrease because fewer agricultural landholders would be affected. Similarly, beaver activity would have little or no adverse impact on areas managed for vista purposes and so would not lead to

conflicts. These impacts equate to minor to moderate benefits to populations of these species.

Raccoons, woodchucks, and geese probably would have fewer conflicts with agricultural landholders, but overall impacts on these species would be negligible.

4.3.7.2.Cumulative Impacts

No additional cumulative impacts are expected beyond those outlined for all alternatives.

4.3.7.3.Conclusion

This alternative provides the greatest net benefits to all wildlife species. Benefits to grassland and early successional species would be moderate to major. An overall increase in early successional habitats and decreases in conflicts with humans would offset negligible to minor adverse impacts on deer from some loss of agricultural forage. Coyotes and beaver would also gain minor to moderate benefits from decreased conflicts with humans. Benefits to nuisance wildlife such as raccoons, woodchucks, and geese would be negligible. The implementation of this alternative is not expected to lead to an impairment of the wildlife resources of Cuyahoga Valley National Park.

4.3.8. Impacts of Alternative 4 - NPS Farming

4.3.8.1.Direct and Indirect Impacts

Impacts expected under this alternative would largely be the same as in Alternative 1, with two distinct differences. First, because less area is maintained under vista management in this alternative, it is expected that fewer areas may be available as early successional habitat than in Alternative 1. Large blocks of high quality habitat would remain in the designated habitat management areas. Additional habitat for those species would likely remain since haying may continue or increase in some areas. Overall, a small net loss of early successional and grassland habitats is expected, which would present a negligible to minor adverse impact on species dependent on those habitats.

Secondly, while agricultural uses would increase across the park, less fencing for wildlife deterrence is expected. Therefore deer and other wildlife (e.g., coyote) would continue to have access to high quality forage and hunting areas on many agricultural fields. Some crops may be left unharvested. Depending on the amounts of preferred forage that would occur in this increased agricultural landscape, deer populations could increase above current levels in response to greater food availability. This could result in more vehicle accidents due to presence of more deer leading to minor adverse impacts, but overall distributions of deer would not be expected to change significantly.

Limited increases in SUP holders and long-term lessees would keep conflicts with crop-damaging wildlife from increasing significantly. Harassment and killing of deer and other wildlife would not be expected to increase from current levels. These changes would represent a negligible impact on populations of these species.

4.3.8.2.Cumulative Impacts

Any increase in deer populations above current levels could increase browse pressure on forest ecosystems, adversely impacting sensitive bird species and other wildlife. However, as deer population increases attributable to this alternative are likely to be relatively small, adverse impacts from the same level of increase in browsing would be minor relative to current browse damage to forests.

4.3.8.3.Conclusion

Impacts are largely the same as in Alternative 1, with a few distinct differences. This alternative would have a negligible to minor adverse impact on early successional and grassland species, and a minor cumulative adverse impact on forest understory species. There could be minor to moderate benefits to the white-tailed deer population due to increased forage. Negligible impacts on coyotes, raccoons, geese, and other nuisance species from additional conflicts with SUP farmers are expected. The implementation of this alternative is not expected to lead to an impairment of the wildlife resources of Cuyahoga Valley National Park.

4.3.9. Irreversible or Irretrievable Commitments of Resources

Local extirpations of some forest interior bird species could occur under all alternatives as a cumulative impact due to an amplification of forest fragmentation effects, continued deer overbrowsing in forests, and continued regional degradation and loss of forests. These extirpations of bird species may be an irreversible adverse impact, as these species would not be expected to return without adequate habitat available.

Irretrievable (short-term, reversible) commitments of resources would occur under Alternative 2 because the deer population potentially would exceed the availability of food resources in the short-term, resulting in starvation of a proportion of individuals as the population regulates.

4.3.10. Loss in Long-Term Availability or Productivity of the Resource to Achieve Short-Term Gain

Under Alternative 2, white-tailed deer and coyote productivity could be adversely affected in the long-term.

4.3.11. Unavoidable Adverse Impacts

The conversion of early successional habitats under all alternatives will have unavoidable moderate adverse impacts on forest interior species due to maintenance of forest fragmentation and edge effects.

Under alternative 2, there are unavoidable moderate adverse impacts on early successional species.

Under alternative 4, there are unavoidable negligible to minor adverse impacts on early successional species.

4.4. IMPACTS ON WATER RESOURCES

4.4.1. Regulations and Policies

The NPS is charged with maintaining, rehabilitating and perpetuating the inherent integrity of water resources and aquatic ecosystems consistent with the Clean Water Act and other state and local laws. NPS Management Policies (NPS 2001e, Section 4.6.6) state that the NPS will manage watersheds as complete hydrologic systems, and will minimize human disturbance to the natural upland processes that deliver water, sediment, and woody debris to streams, and will achieve the protection of watershed and stream features primarily by avoiding impacts on watershed and riparian vegetation, and by allowing natural fluvial processes to proceed unimpeded. The *Riparian Buffer Plan for Proposed Agricultural Lands* in CVNP outlines a protocol to explicitly prevent most direct and indirect impacts on rivers and streams from NPS activities through buffer zone establishment (NPS 2002a). The park has recently begun to implement this protocol.

NPS Management Policies (NPS 2001e, Section 4.6.5) and Executive Order 11990 “Protection of Wetlands” direct the NPS to minimize and mitigate the destruction, loss, or degradation of wetlands; preserve, enhance, and restore the natural and beneficial values of wetlands; and avoid direct and indirect support of new construction in wetlands unless there are no practicable alternatives and the proposed action includes all practicable measures to minimize harm to wetlands. NPS policies for implementing Executive Order 11990 are found in Director’s Order 77-1 “Wetland Protection” and the associated Procedural Manual. This order requires that parks assess all direct or indirect impacts, including whether each alternative "supports, encourages, or otherwise facilitates additional wetland development". The *Wetland Protection Plan for Proposed Agricultural Lands* in CVNP outlines a protocol to explicitly prevent most direct and indirect wetland impacts from NPS activities on agricultural lands through wetland identification, delineation, quality assessment, buffer zone establishment, and monitoring (NPS 2002b). The park has recently begun to implement this protocol. Ponds in CVNP are treated as ‘artificial wetlands’ under Director’s Order 77-1. The CVNP Pond Management Plan (NPS 1993b) provides a summary of pond resources and outlines how ponds are managed for recreational values.

Section 5.(d) of the National Wild and Scenic Rivers Act (16 U.S.C. 1271-1287) of 1968 requires that "In all planning for the use and development of water and related land resources, consideration shall be given by all Federal agencies involved to potential national wild, scenic and recreational river areas." It further requires that "the Secretary of the Interior shall make specific studies and investigations to determine which additional wild, scenic and recreational river areas.....shall be evaluated in planning reports by all Federal agencies as potential alternative uses of water and related land resources involved." The Nationwide Rivers Inventory (NRI) is a register of river segments that potentially qualify as national wild, scenic or recreational river areas under the National Wild and Scenic Rivers Act.

4.4.2. Methodology

The analysis of impacts on water resources is based on a review of existing park natural resource data, park planning documents, professional opinion, and scientific literature. No original data collection was undertaken as part of this environmental impact statement.

In addition to the assessment of typical direct and indirect impacts on water resources, the potential that the alternatives would facilitate future development or impacts on water resources or their buffer zones was examined. It was assumed that such situations are most likely to be associated with long-term leasing of farmsteads and new construction activities. It was also assumed that park utilization of structures and maintenance of open space by mowing would not often result in these unavoidable impacts due to the inherent flexibility of these management approaches.

It was assumed that the protective buffers prescribed in the *Riparian Buffer Plan for Proposed Agricultural Lands* and the *Wetland Protection Plan for Proposed Agricultural Lands* would be implemented prior to action and that these buffers would effectively prevent most direct and indirect impacts to water resources. Effects on the scenic values of the Cuyahoga River NRI segment are discussed in general with other scenic values in Section 4.5.3.

All impacts on rivers, streams, ponds, and wetlands were considered qualitatively in this analysis, as few quantitative data are available and many potential impacts are related to yet unspecified site-level plans. Ponds with wetland areas were treated as wetlands in this analysis.

4.4.3. Impacts Common to All Alternatives

Wetlands and Surface Water. The proposed action may affect wetlands and the Cuyahoga River and its tributaries through direct encroachment, livestock activities, disturbances to wildlife, run-off of pesticides, nutrients, and manure, sedimentation, introduction of exotics, and water diversion (Castelle et al. 1992, Wenger 1999). However, the NPS has developed protection plans for CVNP wetland (NPS 2002b) and riparian areas (NPS 2002a) that will prevent direct and indirect impacts on the Cuyahoga River, streams, and wetlands from NPS activities on agricultural lands. Effective protection for these resources will be afforded through the establishment of protective buffer zones that are required under all alternatives. Summaries of these plans are found in Appendix H. No discernable impacts to the Cuyahoga River (including the NRI segment), streams, and wetlands (except as noted in this Section for farm ponds and natural wetland restoration) are expected under the proposed action when these buffer guidelines are followed. It is possible that despite buffer zone establishment, impacts on these resources may yet occur; however, these impacts would be considered negligible. Should any buffers be found to be ineffective through park monitoring efforts, corrective measures and mitigation will be undertaken.

It is possible that the NPS, after determining that no practicable alternative exists, may decide to expressly permit some level of adverse impact on wetlands or other water resources or their buffers to increase the utility or cultural resource value of a structure or farmstead. Such situations can not be readily identified at this time as they are related to site-specific plans not yet developed. Should these situations arise, the NPS will implement environmental compliance and documentation procedures as required under the Clean Water Act, NEPA, and Director's Order 77-1 (Wetland Protection) to examine site-specific impacts. The NPS will first seek to avoid impacts to wetlands. Unavoidable impacts will be minimized and mitigated.

Farm Ponds. The use of two small farm ponds (Leyser and Tadpole) as a water source for agricultural activity is expected under all alternatives since these ponds are assigned to a farming use that is not expected to change. The ongoing use of these 'artificial' wetlands is an excepted action under Director's Order 77-1 not requiring a Statement of Findings. While these ponds are not currently used, water may occasionally be pumped from them to irrigate crops or water livestock. Regular uses would not usually result in significant changes in water levels. Some adverse impacts on pond water quantity and quality, vegetation, and wildlife are expected under regular use, but these are considered negligible to minor. However, during times of drought, such use of the farm ponds may further exacerbate low water levels and dissolved oxygen levels resulting in increased mortality for aquatic wildlife and vegetation. Loss of local breeding populations of some aquatic wildlife could occur. Changes in the type and abundance of wildlife and vegetation in ponds may result. These adverse impacts may range from moderate to major depending on the length of the drought. Impacts are somewhat mitigated by the temporary nature of the impact as water levels would be expected to return over time. Fink Pond may experience similar uses and impacts should it be assigned for agricultural uses under Alternatives 1, 2, or 4.

Natural Wetland Restoration. Natural wetland restoration processes continually occur throughout the park and may be expected to occur in some areas designated for agricultural use in the park. The restoration process in these designated areas may be inhibited under all alternatives for as long as agricultural use continues. Active management of lands or beaver populations may inhibit the restoration of hydrology, hydric soils, and hydrophytic vegetation. Inhibiting this restoration potential constitutes a minor adverse impact on the park's wetland system. Proposed wetland restoration activities would help mitigate these impacts should they be implemented.

None of these impacts common to all alternatives are expected to lead to an impairment of the water resources of Cuyahoga Valley National Park.

4.4.4. Cumulative Impacts Common to All Alternatives

It is likely that continued suburban development outside of CVNP will continue to reduce the number of wetland areas and their quality in the Cuyahoga River watershed, making

CVNP wetlands even more valuable from a regional context. Adverse impacts on wetlands inside the park may become more significant as total wetland area in the watershed is reduced.

Likewise, continued suburban development will likely adversely impact the water quality of rivers and streams outside of the park as well. Any additional adverse impacts on rivers and streams as they pass through CVNP to the Cuyahoga River may further exacerbate such water quality problems. This impact could range from negligible for highly degraded watercourses or minor to moderate for healthier watercourses.

4.4.5. Impacts of Alternative 1 - No Action

4.4.5.1.Direct and Indirect Impacts

It is possible that the NPS may, after determining that no practicable alternative exists, decide to expressly permit some level of adverse impact on wetlands or other water resources or their buffers to increase the utility or cultural resource value of a structure or farmstead. For Alternative 1, NPS-permitted impacts would not be expected to occur or may occur very infrequently since little if any new construction is anticipated and few new long-term leases for active farming will be issued under this alternative. Few situations are anticipated that might require impacting these resources because other practicable options are available. The inherent flexibility of this alternative would usually allow the NPS to easily avoid new actions that may impact wetlands by relocating such actions to other areas. NPS staff and SUP farmers would be required to conform to buffer plans to minimize and avoid impacts on these resources. Any such actions adversely affecting wetlands will require additional site-specific environmental compliance and possibly, permitting and mitigation actions. Should any such impacts occur, they would be considered negligible to minor and largely reduced by mitigation efforts.

4.4.5.2.Cumulative Impacts

No cumulative impacts are expected under this alternative beyond those identified as common to all alternatives.

4.4.5.3.Conclusion

Any adverse impacts on water resources under Alternative 1 would be considered negligible to minor and largely reduced by mitigation efforts. Additional compliance for site-level plans would assess site-level impacts. The implementation of this alternative is not expected to lead to an impairment of the water resources of Cuyahoga Valley National Park.

4.4.6. Impacts of Alternative 2 – Countryside Initiative (Preferred Alternative)

4.4.6.1.Direct and Indirect Impacts

Impacts similar to Alternative 1 are expected, however, in Alternative 2, such impacts on the Cuyahoga River, streams, and wetlands may occur much more frequently because the long-term leasing of farmsteads will likely require that these resources or parts of their protective buffers be used to develop effective working farmstead units. Construction of outbuildings, parking areas, farm ponds, and fencing and the need for livestock movement corridors and stream crossings may adversely affect these resources. Wetland areas may occasionally need to be used as a water source (i.e. when artificial wetlands such as farm ponds are used as a water source), modified, or possibly filled. Any such actions adversely affecting wetlands will require additional site-specific environmental compliance and possibly, permitting and mitigation actions.

Impacts on the Cuyahoga River and its tributaries are expected to be negligible to minor. Impacts on individual wetlands will likely range from negligible to major (should small wetlands be intentionally filled). The overall impact on the entire park watershed and system of wetlands is expected to be negligible as the NPS would largely mitigate any unavoidable impacts by restoring other wetland and riparian areas.

4.4.6.2.Cumulative Impacts

No cumulative impacts are expected under this alternative beyond those identified as common to all alternatives.

4.4.6.3.Conclusion

The potential for and anticipated level of adverse impacts is highest under this alternative relative to the other alternatives. Impacts on individual water resources under Alternative 2 would be considered to be negligible to major depending upon site-level plans that have not yet been developed. Additional compliance for site-level plans would assess site-level impacts. Any adverse impacts on the water resources of the park as a whole are expected to be negligible since any unavoidable impacts would largely be reduced by mitigation efforts. The implementation of this alternative is not expected to lead to an impairment of the water resources of Cuyahoga Valley National Park.

4.4.7. Impacts of Alternative 3 – Vista Management

4.4.7.1.Direct and Indirect Impacts

Impacts similar to Alternative 1 may be expected, except these would be expected to occur even less frequently as no new construction is planned and current farming activities under long-term and short-term leases will be significantly phased out over time. Impacts on water resources are expected to be the lowest among the alternatives. The focus on management for scenic values would allow the NPS to easily avoid any actions that may impact these resources by focusing any remaining construction or farming activities to areas without wetlands. Therefore, should any such impacts occur, they would be considered negligible.

4.4.7.2.Cumulative Impacts

No cumulative impacts are expected under this alternative beyond those identified as common to all alternatives.

4.4.7.3.Conclusion

Any adverse impacts on water resources under Alternative 3 would be considered negligible and largely reduced by mitigation efforts. The implementation of this alternative is not expected to lead to an impairment of the water resources of Cuyahoga Valley National Park.

4.4.8. Impacts of Alternative 4 – NPS Farming

4.4.8.1.Direct and Indirect Impacts

Impacts similar to Alternative 1 may be expected, since little if any new construction is anticipated and few new long-term leases for farming will be issued under this alternative. The inherent flexibility of this alternative would usually allow the NPS to easily avoid new actions that may impact wetlands by relocating such construction plans and long-term leases to other locations. Should impacts occur, they would be considered negligible to minor and largely reduced by mitigation efforts.

4.4.8.2.Cumulative Impacts

No cumulative impacts are expected under this alternative beyond those identified as common to all alternatives.

4.4.8.3.Conclusion

Any adverse impacts on water resources under Alternative 4 would be considered negligible to minor and largely reduced by mitigation efforts. The implementation of this alternative is not expected to lead to an impairment of the water resources of Cuyahoga Valley National Park.

4.4.9. Loss in Long-Term Availability or Productivity of the Resource to Achieve Short-Term Gain

Under all alternatives, inhibiting wetland restoration by managing lands for rural landscape values rather than allowing natural processes to occur may adversely affect the long-term productivity and utility of the wetland system of the park.

4.4.10. Irreversible or Irretrievable Commitments of Resources

Under all alternatives, the use of farm ponds during drought conditions may result in the irreversible loss of aquatic vegetation and wildlife. Wetland restoration processes that would naturally occur in some areas may be inhibited in areas managed for rural landscape values. The loss of wetland functions of these areas is irretrievable.

4.4.11. Unavoidable Adverse Impacts

No unavoidable adverse impacts are expected from the proposed action.

4.5. IMPACTS ON SOCIAL ENVIRONMENT

4.5.1. Regulations and Policies

Enjoyment of park resources and values is part of the fundamental purpose of all parks. The NPS Management Policies 2001 (NPS 2001e) provides the basic service-wide policies on visitor use and recreation activities (Section 8.2.2), visitor safety (Section 8.2.5), and interpretation and educational activities (Section 7.1). Director's Order #83: Public Health provides additional guidance.

4.5.2. Methodology

In evaluating impacts on the social environment, four areas of potential impact were analyzed: health and safety, nuisance wildlife, visitor use and experience, and local communities. The analysis of impacts on the social environment is based on a review of park planning documents, professional opinion, park surveys, and scientific literature. No original data collection was undertaken as part of this EIS.

The impacts on health and safety were qualitatively assessed by estimating the anticipated amounts of electric fencing and use of guardian animals under each alternative. The potential for increased deer-vehicle accidents was directly related to anticipated changes in deer populations and distributions discussed in Section 4.3. Similarly, impacts on the human component of the nuisance wildlife issue (how humans are impacted) were assessed based on the expected impacts on nuisance wildlife analyzed in Section 4.3.

The impacts on visitor use and experience were qualitatively assessed based on feedback from visitors about what they enjoy seeing (scenic values) and doing (recreational activities) in the park as indicated in Visitor Use Surveys (performed annually since 1998) and earlier research performed in the park (Anderson et al. 1992; Schleicher et al. 1994).

Impacts on local communities were based on qualitative assessments of the effects on school districts, local economies, businesses, and farmers. Economic impacts are not addressed in specific dollar amounts as actual direct and indirect impacts are difficult to predict and are dependent on many yet undefined factors. Therefore, only general and relative impacts are assessed.

Because the specific future uses of properties are not currently known, the proportion of the 54 *properties* to be used for residential purposes under each alternative was assumed to be equal to the proportional amount of *structures* assigned SUP and other short-term and long-term agreements (Table 2.1). The estimates of residential properties are: 30 (56 percent) under Alternative 1, 38 (70 percent) under Alternative 2, and 14 (25 percent) under Alternative 3 and 4.

Estimates of the number of children that school districts may have to accommodate were developed from estimations derived from a cursory review of current families living in park properties and recent proposals for the Countryside Initiative leasing program. Based on past patterns, approximately 1 in 3 NPS residential properties may have an average of 2 school-aged children. Impacts on school districts are partially based on interviews with the Woodridge School District's superintendent.

4.5.3. Impacts Common to All Alternatives

Scenic Values. Under all alternatives, the clearing of "older fields" to preserve the rural landscape will affect visitors by changing the scenic values of the park. Those visitors who prefer the aesthetics of a landscape composed of a patchwork of cleared or farmed areas with natural areas comprised largely of forests will experience moderate benefits from the proposed action.

For visitors who value the park primarily for its natural areas and prefer to see areas of human disturbance being reclaimed by natural processes, the proposed action will have moderate adverse impacts. Large relatively undisturbed areas will remain, but many recently disturbed areas will be kept clear, precluding closure of forest gaps in many areas.

Rehabilitation and preservation of the existing historic structures will provide moderate to major beneficial effects on the scenic values of the cultural landscape under all alternatives.

Wildlife Viewing. Additionally, visitors who value the park for its diversity of plants and animals may find bird-watching and wildlife viewing opportunities and variety reduced in "older fields", which will be reduced by 41 percent. Many species of terrestrial birds, small mammals, butterflies, and other insects inhabiting these could be affected. These habitat conversions would result in a decrease in the number of areas and species people may view. These decreased wildlife-viewing opportunities will result in minor to moderate adverse impacts.

Local Communities. Under all alternatives, incremental changes in the number of NPS structures that are in active use are expected as they are rehabilitated. Some economic impacts on local communities from additional costs related to fire and emergency services, law enforcement, and road maintenance may be expected. These impacts would be widely distributed among park communities as most communities have six or fewer properties involved in the proposed action. Boston Township has the greatest potential for economic impact. Many of these changes in use involve simply switching from one type of active use to another, as all but 13 rural landscape properties are already in some kind of active use. Therefore, related economic impacts are considered negligible to minor and largely mitigated by the cooperative efforts and reimbursement programs already in place.

Similarly, no discernable changes in property tax revenue are expected as proposed NPS lands and properties have not been subject to property tax since their acquisition by the NPS.

None of these impacts common to all alternatives are expected to lead to an impairment of the social environment of Cuyahoga Valley National Park.

4.5.4. Cumulative Impacts Common to All Alternatives

Should the loss and fragmentation of forest habitats outside of the park continue, forest habitats in the area will become increasing degraded. With the added fragmentation effects of the proposed action and continued deer impacts, this condition could lead to a loss of sensitive forest bird species (see Section 4.3.4). This would have a minor adverse impact on bird-watching opportunities.

4.5.5. Impacts of Alternative 1 - No Action

4.5.5.1.Health and Safety

Additional fencing and/or guardian animals, particularly near high visitor use areas, can adversely affect human health and safety. Humans coming into contact with electric fencing may be startled and experience temporary discomfort by the brief shock delivered by the fencing. Additionally, guardian animals could bite, startle, harass, or otherwise affect a person who gets too close to the fenced, guarded area. Also, despite measures to prevent it, guardian animals could escape enclosed areas and threaten people.

As the use of electric fencing and guardian animals is currently very limited and is not expected to increase significantly under this alternative, the adverse impact on human health and safety is considered negligible.

No discernable change in deer-vehicle accident rates or locations is expected under this alternative.

4.5.5.2.Nuisance Wildlife

Attraction of deer, woodchucks, raccoons, and geese to greater amounts of corn or other vulnerable crops under this alternative may cause increased crop damage, resulting in negligible to minor adverse impacts on farmers.

Some agricultural areas near wetlands are likely to be impacted by beaver activities despite buffer zones, either from flooding due to damming, or damage to crops and trees. Impacts from these localized and uncommon events would be negligible to minor, as management actions (e.g., removal of dams or beaver) would likely mitigate any impacts on private landholders or NPS lessees.

4.5.5.3.Visitor Use and Experience

Farming activities in the park help contribute to the rural and historical scene of the park. Some visitors come to the park to enjoy viewing and experiencing this setting. However, some visitors consider the presence of farming in a national park as an intrusion into a natural scene. While farming is expected to increase across the park, it will remain similar in type and methods currently used in the park. Livestock, new construction, and fencing will be limited, and few working farmsteads will be active. This lack of a qualitative change in farming look and appearances will result in negligible impacts on the scenic values and sense of place.

Additionally, visitors may find bird-watching and wildlife viewing opportunities increased in early successional habitats. The increase in mowed areas will provide additional habitat and areas where they might be more easily seen. Many species of birds, butterflies and other insects inhabit these areas. Deer grazing activities will be easier to observe, as they will use unfenced agricultural areas as well. These increased wildlife-viewing opportunities will result in minor beneficial effects.

4.5.5.4.Local Communities

Under Alternative 1, it is possible that families with school age children may reside in park properties under leases or other agreements. Changes in the number of school children residing on NPS properties would occur gradually over time and fluctuate. School districts would be required to make space for and educate these children without the benefit of local property taxes that usually would largely support associated costs.

An estimated 30 properties would be available for residential use under this approach. This is an increase of 3 from the current situation. Not all leases or agreements would include residential use. Some may be primarily related to recreational, business, agricultural, or other uses.

Additional children residing in NPS properties may not result in significant changes from the current situation for many school districts. While leased properties will increase in number under this alternative, this increase is directly proportional to the number of life estate and retention properties that are taken into full possession by the NPS. Conversion of these properties (especially the retention properties) to full NPS management may actually remove some children from local school districts. Impacts on potentially affected school districts are considered negligible, since few additional residential properties and at most a few children would be added to any one district.

Changes in local revenue from income taxes from residential, business, or agricultural uses would be expected under this alternative for the communities that collect such tax, especially from the 13 vacant properties that may be put back into use. These changes are expected to result in overall negligible to minor beneficial economical impacts on local communities.

The availability of additional lands for farming under SUP would have a minor beneficial effect on local farmers. A slight increase in the number of agricultural leases and farmers in the park is expected to have negligible impacts on existing farmers. Negligible effects on other local businesses are expected.

4.5.5.5.Cumulative Impacts

Continued growth in residential communities surrounding the park may place added pressures on the space available in the Woodridge School District, increasing the level of adverse impact of additional school children from NPS properties. Should the district build new facilities to house a larger student population in response to this growth, these impacts would be reduced.

4.5.5.6.Conclusion

The adverse impacts of Alternative 1 on human health and safety due to electric fencing, guardian animals, or deer-vehicle accidents are considered negligible. Impacts due to nuisance wildlife would be negligible to minor. Lack of a qualitative change in farming look and appearances will result in negligible impacts on the scenic values. Increased wildlife-viewing opportunities will result in minor beneficial effects. Negligible to minor economical beneficial effects are expected for local communities. Negligible effects on existing farmers and other local businesses are expected. The implementation of this alternative is not expected to lead to an impairment of the social environment of Cuyahoga Valley National Park.

4.5.6. Impacts of Alternative 2 - Countryside Initiative (Preferred Alternative)

4.5.6.1.Health and Safety

Similar impacts on human health and safety are expected under Alternative 2 as they are under Alternative 1. However, considerable use of electric fencing and guardian animals is expected under Alternative 2 due to the requirement that farm operations be economically sustainable. Farmers would undoubtedly use the best available technique to prevent crop and livestock losses within sustainability guidelines.

Additionally, farmers under this alternative are encouraged to actively market and sell their products and are more likely to draw more visitors to their farms. This will increase the likelihood of a visitor's encounter with an electric fence or a guardian animal, despite precautionary measures taken to prevent this. As a result, the adverse impact on health and safety due to electric fencing and guardian animals under Alternative 2 is expected to be minor to moderate when compared to the current state.

Loss of habitat through land conversion and increased amounts of fencing is expected to affect distribution and movements of white-tailed deer. These changes could increase deer-vehicle accident rates in some areas as deer move more in search of adequate food resources. Overall, these changes would be a minor adverse impact.

4.5.6.2.Nuisance Wildlife

Loss of early successional and agricultural habitats through land conversion and subsequent fencing is expected to affect distribution and movements of white-tailed deer and coyotes. White-tailed deer will be forced to aggregate more on the few remaining open areas, including residential areas, as they move more in search of adequate food resources. Increased browse pressure on residential landscaping and gardens will increase the level of deer-human conflicts. Similarly, coyotes will be forced out of prime hunting areas and, being highly opportunistic, would likely increase use of residential areas for foraging. This would be expected to result in greater incidence of human-coyote conflicts. Other species, such as raccoons, woodchucks, skunks, opossums, and geese may also seek other areas for foraging, and exhibit similar tendencies to utilize residential areas more.

Residents may suffer losses in their vegetation and may incur costs for replacement of lost vegetation or deterrents such as fencing. Residents may be moved to increase lethal control measures or trapping of animals in response to these conflicts. Adverse impacts on park residents from increased conflicts with wildlife would be minor to moderate.

4.5.6.3.Visitor Use and Experience

Increased farming activities in the park will help contribute to the rural and historical scene of the park. Buildings will be used and lived in by long-term lessees, creating a lived-in landscape. Sustainable farming will include a wider variety of crops and livestock. A significant increase in the amount and types of fencing and some new construction is anticipated as well.

The increase and qualitative changes in farming in CVNP will help restore the historic, rural, and agricultural component of the landscape thereby increasing related scenic values. A greater ‘sense of place’ would be enhanced by this alternative. Working farmers would have a constant presence on the farms and in the valley. This alternative would allow the NPS to enhance the pastoral landscape in a very real way, as opposed to recreating a museum-type setting. Some visitors will experience moderate benefits from such changes.

However, these changes may detract from the scenery for visitors who prefer to see a more natural landscape. The increased farming activities, new construction, lighting, and increased livestock and fencing will have moderate adverse impacts on those visitors.

New fencing will be an obstacle to a visitor's ability to travel throughout the park. Some areas will be removed from public access. Visitors who choose to explore the park by walking on NPS land off trail, may be somewhat thwarted in their travels by additional fencing in the park. Minor adverse impacts on visitors are expected because of this new limitation.

An increase in the amount of farm-related activities (e.g., harvest festivals, fairs), the wider variety of farm products available for purchase in CVNP, and NPS ranger-led interpretive programs associated with the rural landscape and agricultural heritage will provide additional educational and recreational opportunities for visitors. Moderate beneficial effects to visitors are expected.

Additionally, visitors may find bird-watching and wildlife viewing opportunities decreased in agricultural lands. Reduced opportunities for viewing early successional species may result from the conversion of many early successional or hayed areas to agriculture, although two large significant areas are being preserved. Additionally, deer that usually graze in open agricultural fields may be excluded from these fields by fencing, reducing the opportunity for visitors to view them. These decreased wildlife-viewing opportunities will result in moderate adverse impacts.

4.5.6.4.Local Communities

Impacts on local school districts similar to Alternative 1 are expected under this alternative. However, the impacts from this alternative are slightly greater due to the higher availability of residences and the focus on long-term agricultural leases.

An estimated 38 properties would be available for residential use under this approach. This is an increase of 11 from the current situation. Most of these would involve long-term leases with residential use rather than other types of uses. Therefore the likelihood of school age children residing in these properties is highest among the alternatives.

The greatest potential for impact exists for the Woodridge School District as most of the residential properties (74 percent) are found in that district. Woodridge School District's superintendent views every new child as a discrete significant impact due to this space limitation and the lack of local revenues from these NPS properties (McGuire 2002). Impacts on other potentially affected school districts are considered negligible since few additional residential properties and at most a few children would be added to any one district.

Woodridge School District may experience a net increase of approximately 8 residential properties (74 percent of 11 new residential properties). This district is likely to eventually harbor a large proportion of the new farmsteads (which include some now vacant properties) and possibly other new residential uses of park properties due to the high numbers available in this district. It may therefore be expected that 10-20 additional

children might be added to the school district gradually over the next 10 years, although this number would fluctuate based on graduations. Adverse impacts would be minor to moderate, increasing with added enrollment.

Changes in local revenue from income taxes from residential, business, or agricultural uses would be expected under this alternative for the communities that collect such tax, especially from the 13 vacant properties that may be put back into use. The emphasis on residential use and economically sustainable farm businesses may result in additional tax revenue when compared to Alternative 1. There is the potential for significant additional revenues coming into local communities, not only in the form of gross income, but also in the form of other related local spending by farmers and visitors. Local businesses may benefit from increased visitation. These changes are expected to result in overall minor to moderate beneficial effects on local communities.

The addition of 25-30 new farm businesses into the park will have impacts on other local farmers. Because the majority of the lands under Alternative 2 will be managed as long-term leases, the availability of lands for SUP farming will decrease over time. This could have a negligible to minor adverse economic impact on those local farmers who depend on NPS land for their business. It not likely to result in significant direct competition between farmers due to the types of new, specialty niche markets resident farmers are expected to produce compared to the larger, existing farm operations in and around the park. However, the new farms could draw customers away from current farmers and grocery businesses by offering new and novel products for consumption. This competition could result in minor adverse impacts on local farmers. However, the visibility of the new Countryside Initiative program and the addition of new farms may increase the popularity of all farms in CVNP, increasing visitation and business for all local farmers. This could result in minor beneficial effects on local farmers.

4.5.6.5.Cumulative Impacts

Cumulative impacts of Alternative 1 also apply for Alternative 2. In addition, the continued loss of grassland and other open habitats in surrounding areas could exacerbate the bird-watching opportunity impacts by reducing the potential for recolonization.

4.5.6.6.Conclusion

Impacts on health and safety due to increased fencing and guardian animals will be minor to moderate under Alternative 2. Deer-vehicle accidents may increase, causing minor adverse impacts on visitors. Nuisance wildlife may lead to minor to moderate adverse impacts. Minor adverse impacts from limited access to park areas as a result of fencing are expected. Moderate beneficial effects are expected due to increased farm-related activities and programs.

The increase and qualitative changes in farming in CVNP will help restore the historic rural and agricultural component of the landscape thereby increasing related scenic values. The revitalization of an active, lived-in landscape will help enhance a 'sense of place' in the valley. Some visitors will experience moderate beneficial effects from such changes. However, they may detract from the scenery for visitors who prefer to see a more natural landscape to view wildlife and birds; these visitors may experience moderate adverse impacts.

Woodridge School District may experience minor to moderate adverse impacts due to an increase in the number of school children. Overall minor to moderate beneficial effects on local communities are expected in the form of increased revenue from properties being put back into use and increased local spending. Local farmers and grocery businesses may experience minor adverse impacts from increased competition. Local farmers may experience negligible to minor adverse impacts because of a reduction in available SUP land, but they may receive minor beneficial effects from the visibility of the Countryside Initiative. Other local businesses may experience minor benefits from increased visitation. The implementation of this alternative is not expected to lead to an impairment of the social environment of Cuyahoga Valley National Park.

4.5.7. Impacts of Alternative 3 - Vista Management

4.5.7.1.Health and Safety

Alternative 3 is expected to have even less of an impact on health and safety than Alternative 1. The only anticipated use of fencing or guardian animals would be through farmers who already use them; little or no new fencing is expected. The amount of fencing might even be reduced as SUPs expire and those fields are then managed under the Vista Management approach. As a result, the adverse impacts on human health and safety are considered to be negligible. No effects on deer-vehicle accident rates are expected.

4.5.7.2.Nuisance Wildlife

Distributions of deer and coyotes likely would not change and thus human conflicts with these species would either remain the same or probably decrease because fewer agricultural landholders would be affected. Similarly, beaver activity would have little or no adverse impact on areas managed for scenic values and so would not lead to conflicts. Raccoons, woodchucks, and geese probably would have fewer conflicts with agricultural landholders. Overall adverse impacts on residents and farmers would be negligible.

4.5.7.3.Visitor Use and Experience

The significant reduction of farming in the park may have moderate adverse impacts on visitors who view agricultural activity, farmsteads, and fencing as valuable to the rural landscape. This may also have a negative effect on a visitor's sense of place. This reduction in farming activities and livestock may have moderate beneficial effects on those visitors who prefer to see a more natural landscape. No increase in fencing is expected under this alternative, and fencing may actually diminish somewhat, resulting in negligible impacts on scenic or recreational values.

Additionally, visitors may find bird-watching and wildlife viewing opportunities increased in early successional habitats. The significant increase in mowed areas will provide additional habitat and areas where many species of birds, butterflies, and other insects could be seen. Deer grazing activities will be easier to observe, as they will use open fields as well. These increased wildlife-viewing opportunities will result in moderate beneficial effects.

4.5.7.4.Local Communities

Under Alternative 3, many properties (13 of 27; 48 percent) that now have residential uses (life estates, retentions, short-term park leases) are expected to be converted to non-residential uses as scene-setters. This would likely result in a net loss of school children residing on NPS properties and attending local schools. Negligible to minor benefits to currently affected local school districts are expected from this reduction.

Local communities that collect a local income tax on residents may experience a net decrease in income as currently occupied buildings are taken out of active uses. Adverse impacts on local communities would be negligible to minor as few properties are potentially affected in the taxing municipalities.

Because the majority of the lands under Alternative 3 will be managed for scenic values, the availability of lands for SUP farming will decrease and possibly be largely eliminated. This could have a minor to moderate negative economic impact on those local farmers who depend on NPS land for their business. Negligible effects on other local businesses are expected.

4.5.7.5.Cumulative Impacts

No additional cumulative impacts are expected beyond those outlined for all alternatives.

4.5.7.6.Conclusion

Alternative 3 is likely to have even less of an adverse impact on health and safety as Alternative 1. These impacts are considered to be negligible. No effects on deer-vehicle accident rates are expected. Impacts caused by nuisance wildlife would be negligible. The significant reduction of farming in the park may have moderate adverse impacts on visitors who view agricultural activity, farmsteads, and fencing as valuable to the rural landscape. However, moderate beneficial effects are expected for visitors who prefer a more natural landscape or enjoy wildlife viewing and birding. The reduction in residents would likely have negligible to minor benefits to affected local school districts, but negligible to minor adverse impacts on local communities' tax bases. Local farmers who use NPS land may experience minor to moderate adverse impacts. Negligible effects on other local businesses are expected. The implementation of this alternative is not expected to lead to an impairment of the social environment of Cuyahoga Valley National Park.

4.5.8. Impacts of Alternative 4 - NPS Farming

4.5.8.1.Health and Safety

The impacts of electric fencing and guardian animals on human health and safety under Alternative 4 are expected to be similar to Alternative 1. Little or no new fencing is expected under this alternative, although it may be installed in a few cases by SUP farmers or for NPS demonstration or historical farms. Overall, these adverse impacts on health and safety are expected to be negligible.

Since agricultural uses would increase across the park with little added wildlife deterrence, deer populations could increase above current levels in response to greater food availability. This could result in more vehicle accidents and minor adverse impacts due to presence of more deer, but overall distributions of deer would not be expected to change significantly.

4.5.8.2.Nuisance Wildlife

Limited increases in SUP holders and long-term lessees would keep conflicts with crop-damaging wildlife from increasing significantly. Harassment and lethal control of deer and other wildlife would not be expected to increase from current levels. These changes would represent a negligible adverse impact on populations of these species.

4.5.8.3.Visitor Use and Experience

No significant qualitative changes in how farming appears in the park are expected. A basic increase in farming activities will have minor beneficial effects on visitors who

view agricultural activity as valuable to the rural landscape and their sense of place. There will be minor adverse impacts for visitors who prefer a more natural landscape. Educational programs related to NPS farming activities might provide minor benefits to visitors as well.

Deer grazing activities will be easier to observe, as they are expected to increase in number and will use unfenced open fields as well. These increased wildlife-viewing opportunities will result in minor to moderate beneficial effects.

4.5.8.4.Local Communities

Impacts on school districts and local income tax revenues are the same as in Alternative 3.

Under this alternative, SUP farming will remain relatively the same over time, having negligible economic impact on local farmers. The addition of NPS farming would not increase competition and may benefit local farmers by increasing the visibility of farming activities in CVNP. Negligible to minor beneficial effects on local farmers may result. Negligible effects on other local businesses are expected.

4.5.8.5.Cumulative Impacts

No additional cumulative impacts are expected beyond those outlined for all alternatives.

4.5.8.6.Conclusion

Under Alternative 4, impacts on health and safety would be similar to Alternative 1. However, deer populations could increase above current levels in response to a greater amount of unprotected food. This could result in more vehicle accidents due to presence of more deer resulting in minor adverse impacts. Impacts due to nuisance wildlife would be even less than Alternative 1. The increase in farming activities will have minor beneficial effects on visitors who view agriculture as valuable. There will be minor adverse impacts for visitors who prefer a more natural landscape. Educational programs related to NPS farming activities might provide minor benefits to visitors as well. Increased wildlife viewing opportunities will result in minor to moderate beneficial effects. Impacts on school districts and local income tax revenues are the same as in Alternative 3. Finally, negligible to minor beneficial effects on local farmers may occur. Negligible effects on other local businesses are expected. The implementation of this alternative is not expected to lead to an impairment of the social environment of Cuyahoga Valley National Park.

4.5.9. Irreversible or Irretrievable Commitments of Resources

The possible local extirpation of some species associated with early and late successional habitats, combined with continued regional losses of these habitats could result in an irreversible loss of certain bird-watching opportunities.

4.5.10. Loss in Long-term Availability or Productivity of the Resource to Achieve Short-term Gain

None are expected.

4.5.11. Unavoidable Adverse Impacts

For visitors who value the park primarily for its natural areas and prefer to see areas of human disturbance being reclaimed by natural processes, the proposed action will have moderate adverse impacts. Additionally, visitors who value the park for its diversity of plants and animals may experience minor to moderate adverse impacts from decreased bird-watching and wildlife viewing opportunities.

Under Alternative 1 and 2, minor to moderate adverse impacts on the Woodridge School District may result from additional children in park properties.

Local communities may experience negligible to minor losses in local income tax revenues under Alternative 3 and 4.